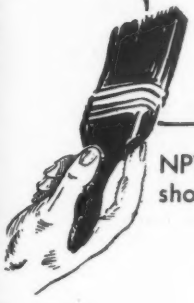
PVP
IN OUR 50th YEAR
JANUARY 1960
PAINT and VARNISH PRODUCTION

NEWPORT
NPT CONCENTRATE

FOR EXTERIOR
POLYVINYL ACETATE EMULSION PAINTS
and
ACRYLIC EMULSION EXTERIOR PAINTS



NPT CONCENTRATE improves the adhesion of these latex paints and should be instrumental in effecting a raw material cost reduction.

FLORIDA EXTERIOR EXPOSURE TESTS

Based on 18 months exposure, NPT CONCENTRATE modification improves the adhesion of latex paints when repainting chalky or cleaned brick surfaces. Improved adhesion is also evident over synthetic chalk on asbestos shingles. In this work as high as 50% replacement of the latex has been made with NPT CONCENTRATE.



Over asbestos shingles, modification with up to 50% NPT CONCENTRATE has not adversely affected a polyvinyl acetate system, nor has modification with 38% NPT CONCENTRATE affected an acrylic system.

In one acrylic series, modification with up to 30% NPT CONCENTRATE has not affected durability on yellow pine.

Write for new product literature and sample

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A Division of Heyden Newport Chemical Corporation
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Photomicrograph of an air bubble entrapped in a lacquer film on mahogany panel.

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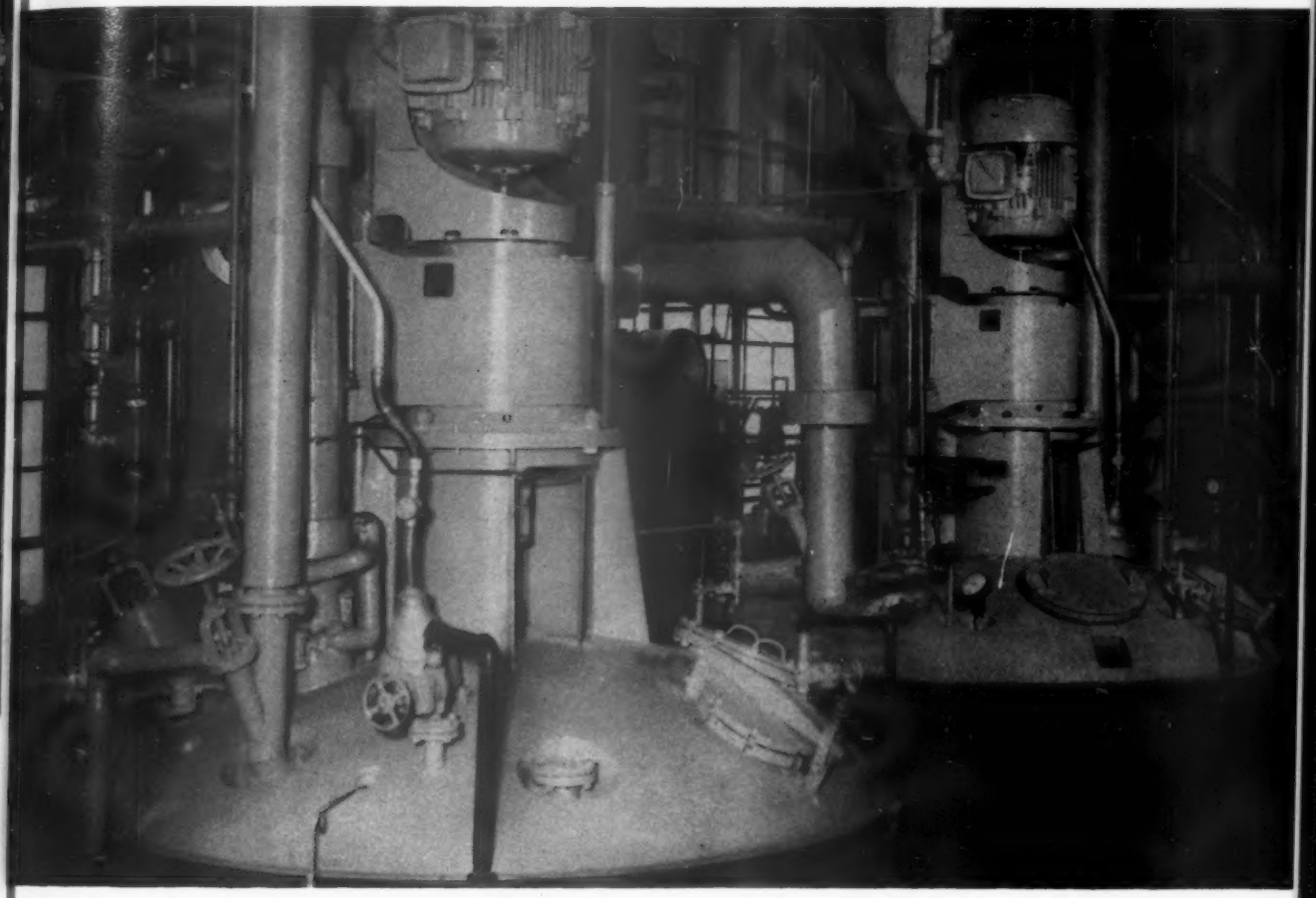
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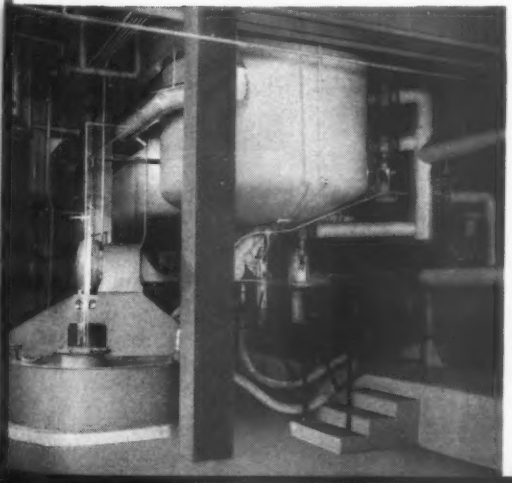
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PAINT and VARNISH PRODUCTION

(REG. U.S. PATENT OFFICE)

JANUARY 1960

Formerly PAINT and VARNISH PRODUCTION MANAGER
(Established in 1910 as The Paint and Varnish Record)

VOLUME 50
NO. 1

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In Our 50th Year

NEXT ISSUE

Paint manufacturing operations on the West Coast will be featured in our February issue. Raw material distribution, plant write-ups, and paint consumption will be covered. Also, complete details on the Fifth Biennial Spring Symposium and Paint Materials and Equipment Show of the Pacific Coast Paint and Varnish Production Clubs to be held on February 25-27 in Los Angeles will also be included.

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EDITORIAL COMMENT

A New Decade

AS we begin a new decade which has been dubbed "The Fabulous Sixties," businessmen see in 1960 a year of high activity.

Most of the nation's leading economists predict that the Gross National Product will rise steadily during the year reaching an annual rate of 514 billion dollars by the fourth quarter. This represents a gain of six percent over the mid-1959 level.

One factor which will help to push industrial activity to high levels during the early months of 1960 is the aim of manufacturers to fill the backlog of orders caused by the steel strike. For example, the automobile industry is planning to manufacture 2,240,600 cars during the first quarter, compared with the previous record of 2,129,000 in first quarter of 1955, which was a banner year. Of course, these ambitious plans will be shattered, in the event there is a resumption of the steel strike.

Executives of major appliance producers are forecasting record sales for their wares in 1960. With the appliance industry enjoying a tremendous replacement market for refrigerators, ranges, washing machines, etc., business in this field is expected to equal the record year of 1956.

Construction for 1960 will match the 1959 record, according to a recent forecast by the Department of Commerce. Home and highway building will be down, but schools, commercial and industrial construction should show substantial increases.

The downturn in housing will be the first since the end of World War II, amounting to a drop of about one percent below last year's record year. The Government's tight money policy is blamed for the predicted decline in housing starts which will total 1,250,000 units.

A recent report released by F. W. Dodge forecasts that 1960 total volume will still be huge with contracts amounting over 36 billion dollars. It points out that practically every construction category other than housing should show gains over 1959. Manufacturing buildings will be up to 20 percent; commercial buildings, up 6 percent; schools, up 2 percent, hospitals, up 3 percent; religious building, up 5 percent; social and recreational building, up 7 percent; and public buildings, up 3 percent. Heavy engineering contracts will total 7.8 billion dollars, a gain of 2 percent over the 1959 level.

Plant and equipment spending in 1960 is expected to increase by 19 percent over 1959. It is quite possible that this figure may be on the low side because of uncertainties resulting from the current steel situation. In the event of a settlement in the strike, it is more than likely that business will boost its capital spending still further.

As the First National City Bank December Letter aptly states:—

"Capital investment paves the way for future increases in production and productivity and thus is the key to real economic growth. Businessmen's willingness to maintain a high level of plant and equipment outlays is, of course, fostered by an economic climate in which they feel able to operate peaceably and profitably. These are investments for progress in the true sense of the word. To finance them will require profits running beyond the old peak set in 1956."

The paint industry is setting its sight on a two billion dollar volume for 1960. This means a boost of a quarter billion dollars over the 1959 level. With industrial production and construction activity expected to remain at high levels, this figure could be reached, providing there is not a resumption in the steel strike which will not only drastically cut down the demand for industrial paints but also result in serious shortages of basic chemicals such as napthalene so necessary for the production of important paint products.

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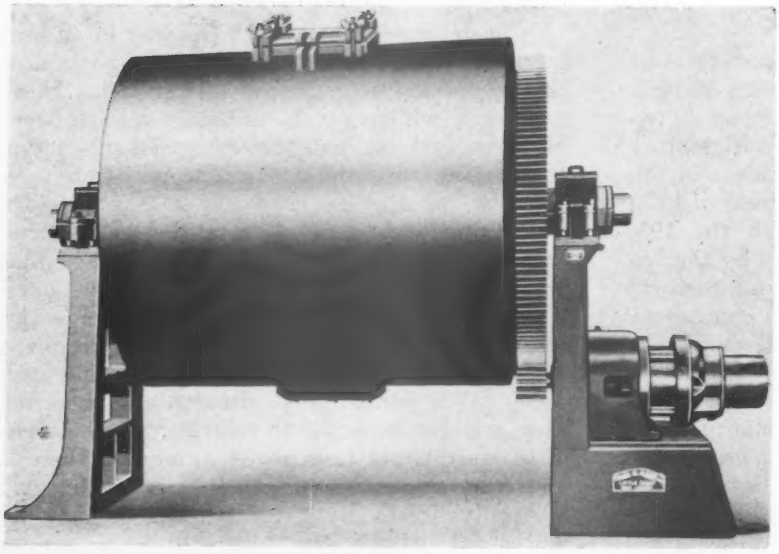
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GOODYEAR

CHEMICAL DIVISION

Pliolite—T. M. The Goodyear Tire & Rubber Company, Akron, Ohio



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how it changed the habits of the world

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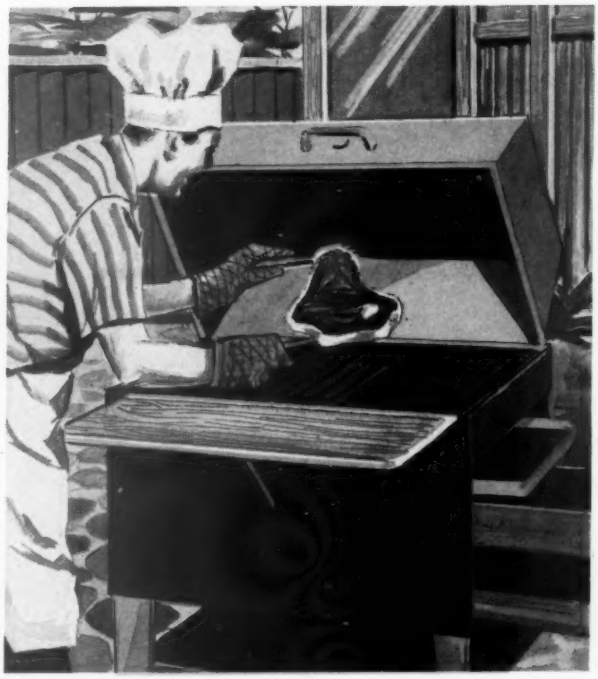
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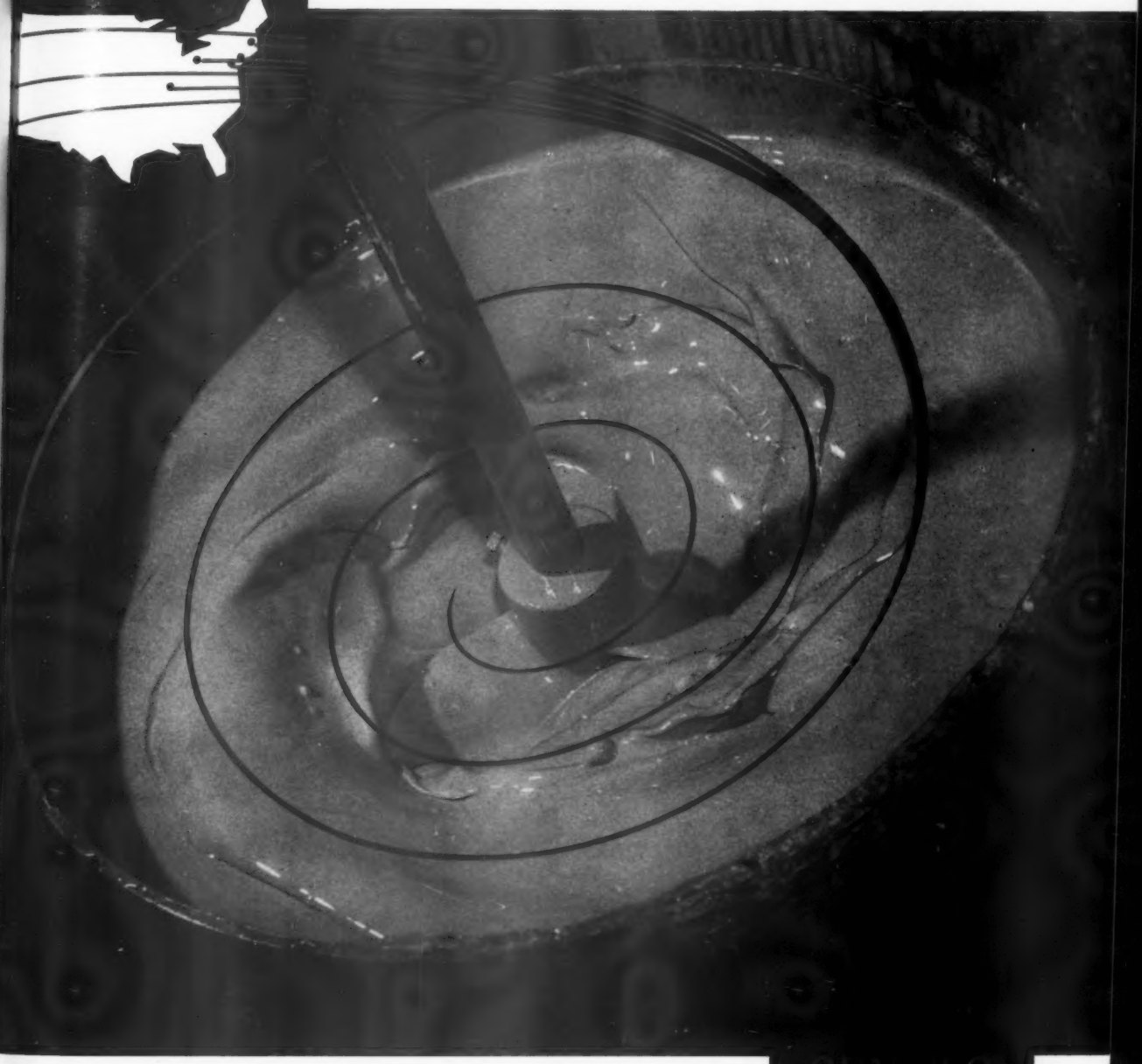
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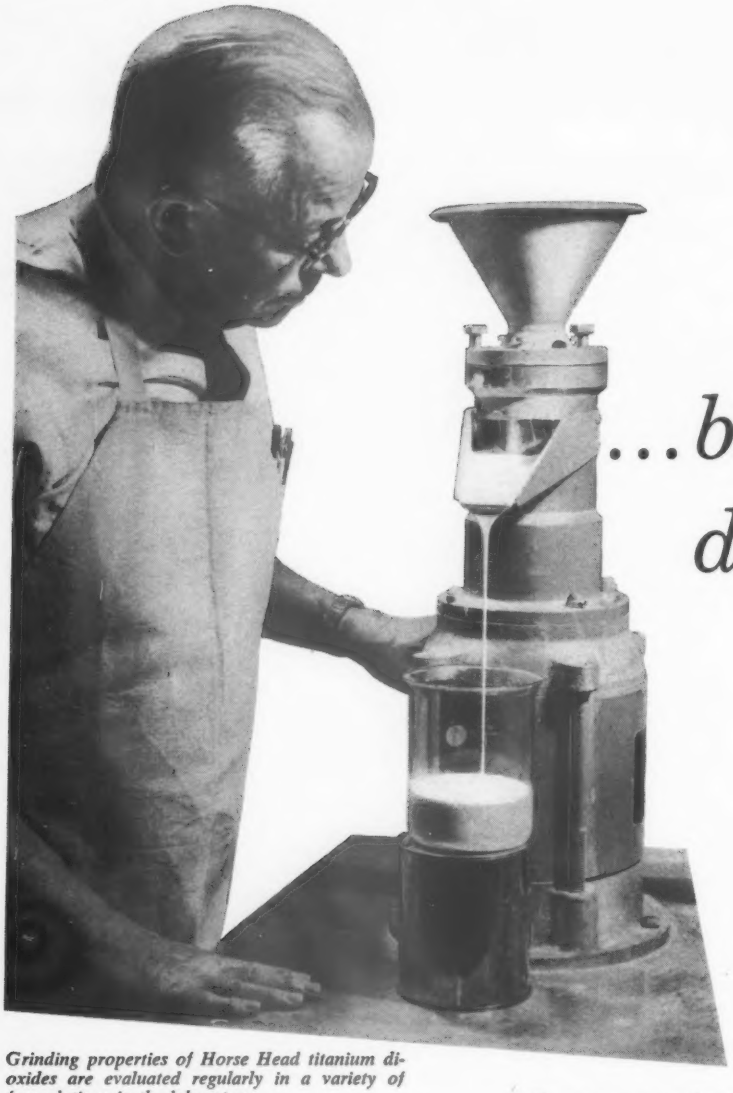
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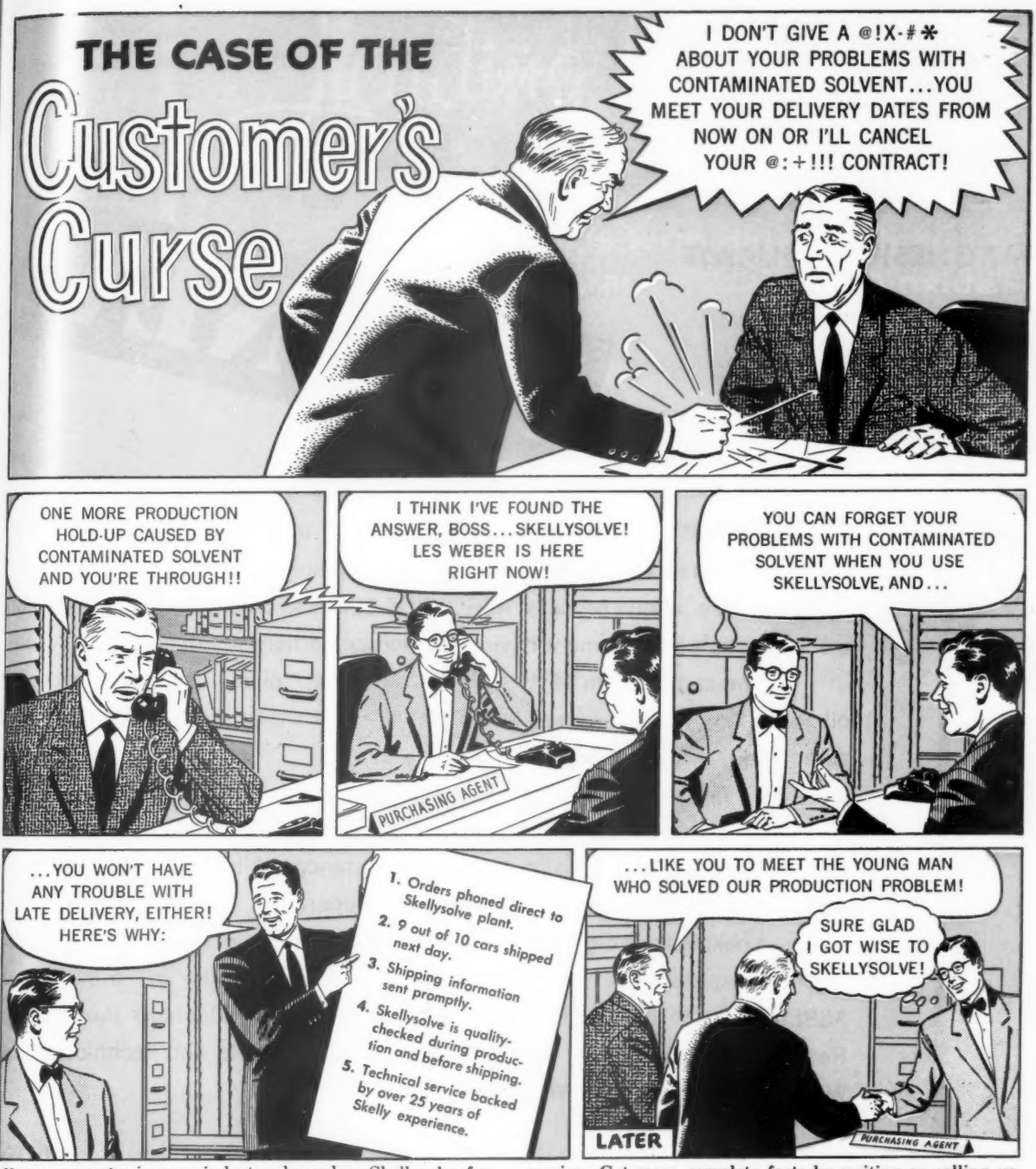
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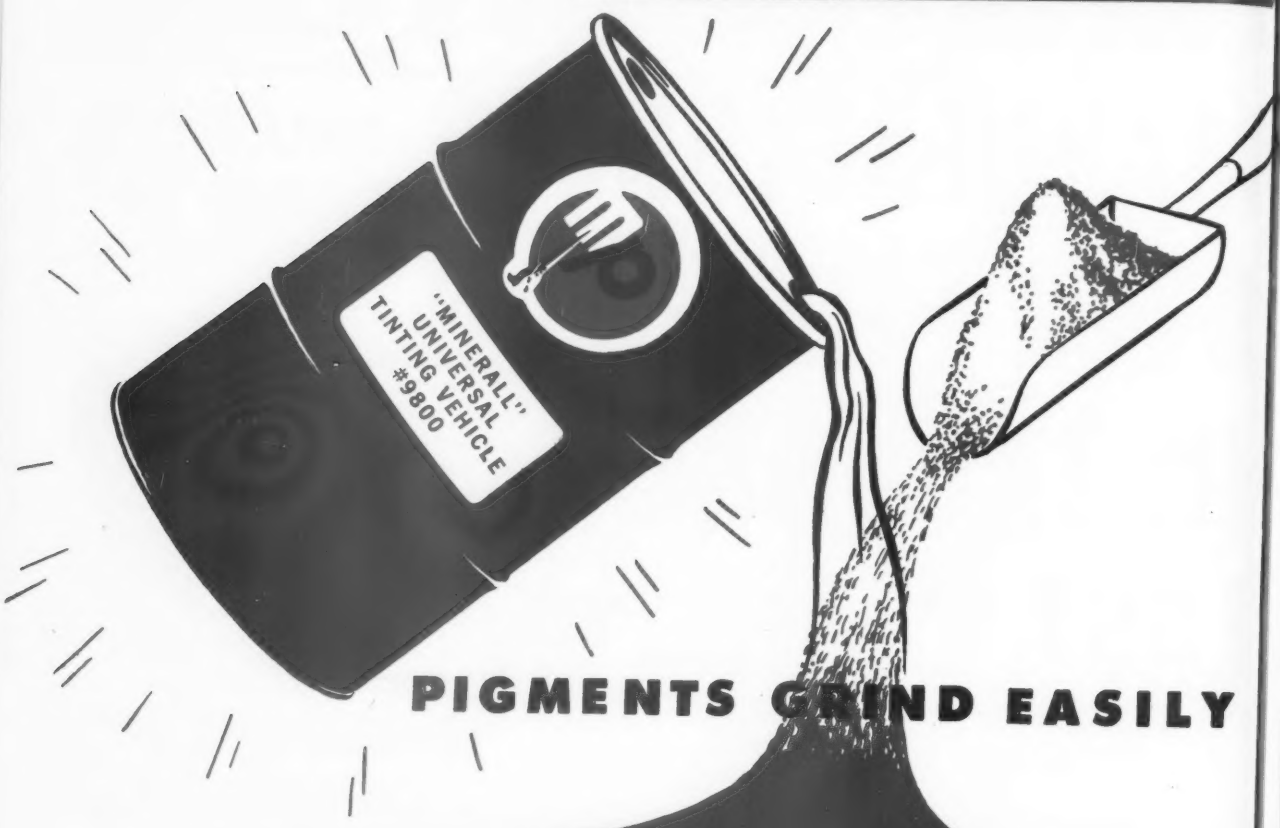
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OUTLOOK for 1960

Paint Industry Shooting for 2 Billion Dollar Target in 1960. Steel Situation Holds Key to High Industrial Activity During Next 6 Months.

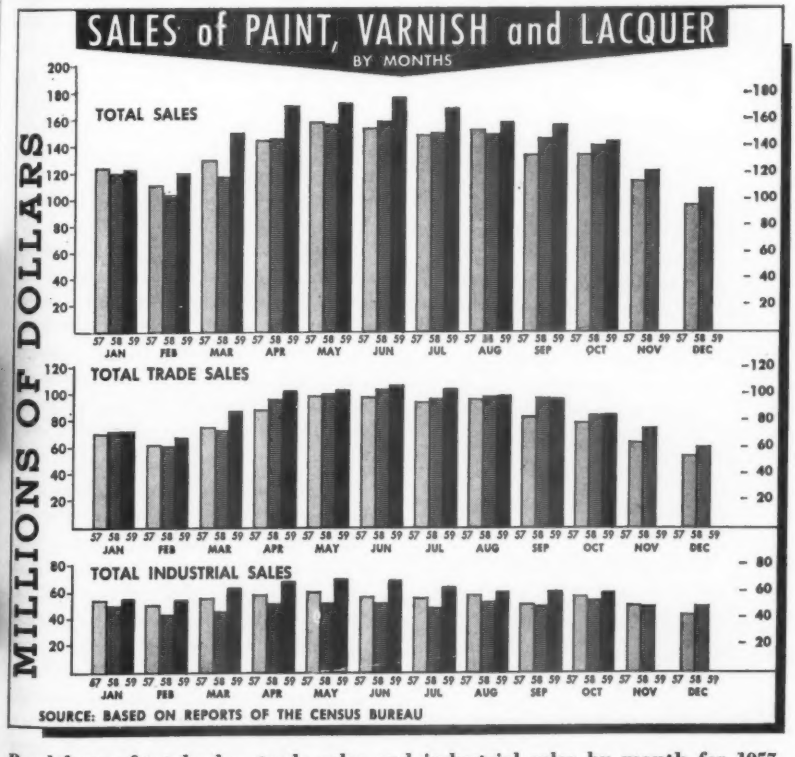
By
ANTHONY ERRICO
Editor

As we enter the fabulous sixties with an unprecedented economic growth predicted, the paint industry is setting its sights on a two billion dollar volume for 1960.

Figures available for the first ten months of 1959 show trade sales to up 6.1%, reaching a volume of $921 million. Industrial sales moved along nicely throughout the year with the exception of October and November when the steel strike caused a drastic cutback in automobile production. Yet the economy as a whole withstood the consequences of the steel strike as overall industrial production remained at a high level. Sale of industrial coatings hit a $620 million volume for the first ten months of 1959, up 17.1% for the same ten month period of 1959—a further indication that the steel strike did not appreciably affect industrial activity.

Construction volume in 1960 will be equalled to that of 1959. Home and highway building will be down, but schools, commercial and industrial projects are expected to increase during the year.

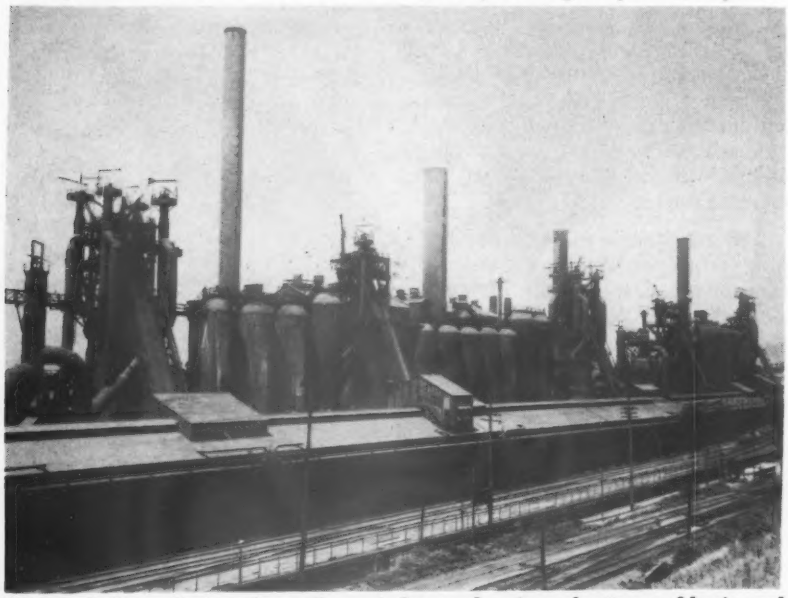
The automobile industry is planning record production of passenger cars for the first quarter of 1960. According to Ward's Automotive Reports, the industry hopes to manufacture some 2,240,600 cars during January-March period.



Breakdown of total sales, trade sales and industrial sales by month for 1957, 1958 and Jan.-Oct. period of 1959.

Comparing this volume with the 1955 record year which produced 2,129,000 cars during the same period, it is apparent that the automobile industry is determined to make up for losses resulting from the recent steel strike. However, a resumption in the steel strike will shatter these ambitious plans.

In general 1960 is expected to be a record-breaking year with some tapering off expected during the second half. Total activity will rise steadily during the year as many economists predict that the Gross National Products will reach an annual rate of $514 billion by the last quarter of 1960.



Idle steel plants during the strike period caused serious shortages of basic coal chemical intermediates, so important in the manufacture of protective and allied coatings.

This healthy outlook for business during the coming months will undoubtedly be reflected in greater paint sales, particularly in the industrial field where high levels of production in durable goods are contemplated.

1959 was a year in which most raw materials were in adequate supply. The exception, of course, was the shortage of basic coal chemicals which developed during the last quarter as a result of the steel strike. However, during the last 12 months many new and improved raw materials were introduced, ranging from new intermediates to new additives. The following comprehensive discussion relates the trends and developments which have taken place in paint raw materials during the past year and the effect they will have on the paint field as a whole in 1960.

Intermediates

Phthalic Anhydride

Unquestionably, the most important development in the field of paint intermediates is the current shortage of coal chemicals, particularly naphthalene caused by the steel strike. Despite the Taft-Hartley injuction which brought the steelworkers back to the mills, and the possibility of complete settlement of the strike during the 80-day cooling off period, naphthalene will be in short-supply for some time to come.

T. J. Kinsella, president of the Plastics and Coal Chemicals division of Allied Chemical Corp., speaking before the recent annual meeting of the American Coke & Coal Chemicals Institute sums up the naphthalene situation this way:

"The primary problem is the shortage of naphthalene and the inability to depend on foreign markets. With production of phthalic anhydride about 1/3 greater in 1959 than in 1958, demand for naphthalene has been strong."

Mr. Kinsella pointed out that little foreign naphthalene is available and that which can be obtained is offered at about 10 cents a pound. This is considered well above the price consumers in the country are willing to pay.

Since 80% of naphthalene goes into the manufacture of phthalic anhydride, a critical shortage of this important material is expected to remain for sometime, depending on how fast a settlement in the steel strike can be achieved.

However, one possible solution may lie in the use of ortho xylene to produce phthalic anhydride. Both phthalic and isophthalic are being made via the ortho xylene process, but the yield from this process is extremely small to have any appreciable effect on the supply situation of phthalic anhydride.

In this connection, Ashland Oil & Refining has announced plans for manufacturing naphthalene from petroleum at its Buffalo, N. Y. refinery. Estimated annual production will be 50 million pounds of naphthalene or 12 million gallons of benzene or combination of both.

Ashland will use the hydroealkylation process developed in their laboratories for synthesizing naphthalene. Pricewise, Ashland feels that the economics of its process will enable them to sell the petroleum derived material competitively with coke-oven naphthalene.

Other petroleum producers who have a process for manufacturing napthalene are Amoco, Tidewater, Union Oil, Sinclair Refining, and Atlantic Refining.

Maleic Anhydride

With one producer after another planning expansion, capacity of maleic anhydride is due for a sizeable increase. Estimates are that by 1963 total production of maleic will be around 70 million pounds, which is far above current requirements, and yet today maleic is very tight.

The answer to this sudden spurt in maleic lies in the growing field of polyesters. Makers of polyester boats have reported such brisk activity during the past year that they were unable to fill the onrush of orders. Another factor contributing to this growth is the increased use of polyesters by the automotive industry as a replacement for structural metal parts. Also, in the construction field, poly-

ester laminates are being used more and more for outdoor applications.

Next to polyesters, alkyds are the next biggest outlet for maleic anhydride. But with a modest growth for alkyds predicted within the next few years, estimates are that consumption of maleic in this market will reach 14 million pounds in 1960, and about 15 million pounds in 1963.

Glycerine

From recently released Government figures, it appears that glycerine production in the United States will reach a new high of 265 million pounds for 1959. Domestic consumption is also expected to reach a high of some 255 million pounds (100% basis) of glycerine.

During the late summer of 1959, glycerine stocks dropped slightly below the 50 million pounds level, but have advanced several million pounds. While there were no serious shortages of glycerine during the past year, some tight situations did develop because of transportation or local stock conditions.

Glycerine supplies for 1960 will be adequate to meet all demands as existing and newly added facilities will assure a high level of production. The reported drop in soap production in 1959 has been offset by increases in fatty acid and fatty alcohol production, so that the total production of refined glycerine from fats is up over 1958 by as much as 130 million pounds if distillation of imported crude is included. Production of glycerine from propylene for 1959 is expected to reach a high of 140 million pounds.

Glycerine consumption in alkyds was higher in 1959 compared to 1958, but from a long term view, it is believed to be levelling off as a slowdown in alkyd growth is predicted because of competition from other paint vehicles, particularly latexes.

Pentaerythritol

The immediate future of pentaerythritol, especially in the first quarter of 1960, is closely identified with the steel situation.

During 1959, the sale of PE, industry wide, were generally running about 15 percent ahead of the previous year. However, several factors must be considered in estimating sales for 1960. In the first place, phthalic anhydride is in very short supply. This, of course, affects the manufacture of PE. Then, too, about one quarter of PE used goes into industrial finishes, and if the steel is not available, there may be a substantial slackening of demand for these industrial finishes.

Some industry estimates are that the demand for PE may be down from this year's peak as much as 15 to 25 percent in the first quarter of 1960. These same sources say that this temporary disallocation will disappear in the second quarter when a deferred demand for protective paints will appear, and these sources expect the demand for PE to be strong the remainder of 1960.

Some 90 percent of domestic PE production goes into surface coatings, alkyd resins, and rosin esters.

Much of today's installed pentaerythritol capacity is based on new markets—both in resin synthesis and other outlet fields.

While there have been no technological "break-throughs" in the use of PE-based alkyds, there has occurred a steady advance in the technology of alkyd resin manufacture and use. Several isophthalic acid formulations have been developed spurred by the current phthalic anhydride shortage.

Pentaerythritol esters of aliphatic acids below 10 carbons are becoming increasingly popular as poly(vinyl chloride) plasticizers in applications where their stability and low volatility offset their somewhat higher cost. One special application of this type is use of dipentaerythritol esters in high-temperature resistant wire insulation.

Similar products show encouraging results in meeting challenges of high-temperature lubricant requirements for modern, high-efficiency jet-aircraft engines.

PE itself, particularly when used with some metal salts, an unusually good heat stabilizer for vinyl chloride polymer and copolymer compositions. The stabilizer mixture is particularly good in rigid and semi-rigid compositions where high processing temperatures are needed.

Pentaerythritol is also being used successfully in fire-retardant coatings which intumesce when exposed to high temperatures. Such coatings froth and swell up upon heating leaving an incombustible, high-surface residue which tends to protect a combustible substrate from fire.

The supply of technical PE and mono-PE will be adequate for all requirements during 1960. Shortages of technical di-PE and technical tri-PE is expected to continue. As by-products, the availability of these two materials is tied to the sales of pentaerythritol.

New Developments

S. C. Johnson introduced Diphenolic Acid during the early part of 1959 and recommended its use in formaldehyde condensation products of mixed diphenolic acid coesters and esterification reactions. Very recent findings with regard to Diphenolic Acid concern the development of a water-solution coating, and the formulation of a derivative, Polyether Acid N-1, as a useful new ingredient for alkyds.

The modification of PE alkyds with fatty acids, glycols, etc. has been common practice for many years. Recent research by Heyden Newport Chemical Corp. has shown that unusual effect may be achieved by modification with formaldehyde. Such alkyds are claimed to have improved film properties as fast drying, flexibility, adhesion, and hardness.

Union Carbide Chemicals is offering a technique for the preparation of coatings from cyclohexene oxide derivatives.

Drying oil varnishes were prepared from unsaturated fatty acids and diepoxides such as EP-201 using a novel sequence of reactions. The diepoxide and fatty acid were mixed in such proportions that, after reaction at relatively mild temperatures, residual epoxide groups were maintained. In the presence of an initiator such as boron trifluoride, the residual epoxide and generated hydroxyl groups condensed to give a soluble polymeric composition which was very useful in surface coating applications.

Films from these compositions cured rapidly at room temperature and at bake temperatures. The fully cured films had excellent color retention when exposed to ultraviolet light and they also had excellent hardness, flexibility and resistance to caustic and water.

Dicyclopentadiene dioxide and limonene dioxide available from

Food Machinery and Chemical Corp. show promise in epoxy and synthesis.

Limonene dioxide is an efficient reactive diluent for epoxy resins. Its difunctionality with respect to epoxy groups permits crosslinking. In the preparation of modified alkyds and polyesters, limonene dioxide is bifunctional and reacts with hydroxyl and carbonyl groups and may be of interest as a crosslinking agent.

Dicyclopentadiene dioxide is a difunctional epoxide and can be used both as a modifier of conventional epoxy resin and as a primary building block for an epoxy resin system. This dioxide can be regarded as a tetrahydric alcohol in reactivity with acids. This high functionality may be of interest in preparing modified alkyds and polyesters.

Rohm & Haas has also entered the field of diepoxides with the introduction of Diepoxide AG-13E. With polyhydroxy compounds, this material reacts to form polyethers ranging from viscous liquids to hard resins.

Drying Oils

Linseed Oil

The latest U.S.D.A. farm crop estimates place both flaxseed and soybeans at production levels below those of last year. The 1959 flaxseed crop is down sharply from that of a year ago (and well below the 10 year average), while soybean reduction is modestly under that of a year ago. By this date the picture on flaxseed and linseed oil marketing has become quite clear. To begin with, support prices for the past crop were sharply reduced. This had the obvious effect of reducing planted acreage. Despite the reduction in planting, the crop would have been more than adequate had we had favorable growing conditions. To the contrary, the flaxseed crop turned out to be a real disappointment, particularly in the Dakotas where soil moisture shortages and extremely high temperatures during July and August took their toll in terms of yield reduction. Thus, throughout the harvest and early fall we witnessed a constantly advancing linseed oil market as flax prices continued to climb. An interesting facet of the flax market picture was that despite the reduced crop and the resulting rising flaxseed market, U.S.A. flaxseed was competitive on a world trading basis throughout the fall months. Thus with a short crop to begin with, and our flax competitive on a world basis, this had the effect of further reducing available supplies. Throughout August and September buyers closely observed these flax developments and anticipating a tight situation, covered their linseed oil requirements well into 1960.

Viewing the current statistical picture on all stocks of flaxseed and linseed oil and balancing available supplies against anticipated demands, it appears that linseed oil will be a rather "tight commodity" throughout this crop year. It is is impossible to predict price levels since there are so many affecting factors. Stocks, while tight, will be adequate to take care of the demands for the forthcoming year.

Soybean Oil

Turning to soybean oil it must be recognized that while the paint and varnish industry consume but a small portion of the soybean oil produced, the total economics of the entire soybean oil and soybean meal industry determine price levels. Actually on a domestice basis the total crush of soybeans is largely determined by the demand for meal, which in turn is dictated by the population of poultry, hogs, and cattle. The demand for soybean meal in terms of soybean bushels crushed will far exceed the domestic demand for soybean oil in similar terms. Therefore, there will be a sizeable supply of oil for which markets must be found. In recent years this has been disposed of largely through government programs such as PL-480. As of this writing exportation of soybean oil under government program or even free dollars does not appear forthcoming in sufficient tonnage. These facts have depressed oil prices to levels not previously seen since pre-World War II. The government has recently estimated that soybean oil will probably not trade at prices higher than 9.5¢ per pound throughout this crop year.

Castor and Safflower

Castor oil supplies pose no problem during 1960. Domestic castor bean production is progressing steadily and will help to stabilize the erratic supply and price fluctuations of imported castor.

The production of safflower seed rose sharply this past year and the oil will be plentiful for all domestic uses.

Fish Oil

This year's total fish oil production should exceed last season by 15-20% despite the poor yield of oil that was prevalent along the Atlantic Coast and Cheseapeake bay areas. When the final tabulations are in the quantity produced should be around 2,500 tankcars.

Predicated on past performances, one can assume that next year's supply should fall in the same range. Over the last decade the annual production ranged from 1800-2400 tankcars. It is difficult to forecast any shortage of oil over the years to come as technological developments and new techniques for catching the fish are constantly being searched for by the various fishing plants.

In recent years, a much improved quality of fish oil has been made available. This stems from recently developed handling methods of the fish itself coupled with better processing operations on the part of the refiner. This has given the industry a grade of oil equal to other competing drying oils at a much more economical level. Recently developed isophthalic alkyds containing fish oil give fast dry, excellent gloss retention and other outstanding characteristics at lower costs than those manufactured from linseed oil or soybean oil. These alkyds can be used in trade sales, primers, architectural enamels and other similar lines. Furthermore, the improved oils can be used in varnishes, rust-inhibiting vehicles and alkyds with good results.

Looking ahead to the future, it is difficult to forecast what role fish oils will play in this expanding economy of ours. However, based on what has taken place in recent years, it is safe to assume that they will carve out an even bigger niche in the protecting coatings industry than they enjoy today.

Tall Oil

Consumption of tall oil has been moving at about 11% each year for the last ten year period. At this rate tall oil consumption reached 600 million pounds in 1959.

The decreasing supply of wood

rosin and the abundance of vegetable oil fatty acids has brought about a change of interest in tall oil during the past few months.

With consumption of rosin up 16% but production at best only 2% higher than 1958, rosin is due to be tight. Since gum and wood sources for rosin show no appreciable increase in production, considerable interest is developing in tall oil as a source for rosin to fill the gap. However present production of wood rosin from tall oil cannot possibly meet this demand for sometime to come.

With the price of soybean showing a downward trend, tall oil fatty acid producers have experienced difficulty to compete at present price levels. But some tall oil suppliers feel that increased production of this material will mean a slight price reduction thus attracting larger usage in the immediate months ahead.

Synthetic Resins

Acrylics

The supply situation for acrylic resin solutions and acrylic latexes should be very good during 1960. Production capacity for the polymers is adequate and there have been recent large scale additions to the capacity for both acrylate and methacrylate monomers.

It is estimated that during 1959 more than 150 million pounds of the monomeric acrylate and methacrylate esters will be produced, representing an output with value over $50,000,000. This value does not include the amount added when these monomers are converted into a large variety of polymers and copolymers by over 50 polymer manufacturers.

The use of methacrylate polymers increased rapidly with the introduction of polymethyl methacrylate cast sheet for aircraft enclosures during World War II. This growth has continued as the use of these polymers expanded into other fields such as coatings for automobiles, aircraft and industrial finishing.

Capacity for the acrylate monomers has kept well ahead of demand, and today there is considerable excess monomer capacity available to support new developments as well as continued growth in present markets.

Additional production capacity for acrylate monomers has recently been made available by the Celanese Corporation and Union Carbide. Dow Chemical has recently announced the formation of the Dow Badishe Company to produce several acrylate monomers in the Texas area.

During the year an interesting development in this field was the introduction of a thermosetting acrylic emulsion for industrial finishing under the designation Rhoplex AC-200. This is an aqueous emulsion of an acrylic polymer for high gloss, color retentive, baking enamels such as finishes on refrigerators and the like. Such finishes have exceptional water, chemical, and humidity resistance, as well as adhesion and impact resistance.

Uses for the acrylic solution coatings have also increased rather rapidly in the last two or three years. A major increase occurred when General Motors switched to acrylic coatings for all new car production. These acrylic automotive lacquers give good gloss retention, light colors and excellent resistance to road tar stains.

There have been many other new uses for the acrylic solution coatings including the well known fluorescent coatings currently being employed on military and civilian aircraft. The acrylic binder in these coatings has excellent color retention and does not interfere with the color of the fluorescent pigments. A clear topcoat with an ultra-violet absorber is applied over the pigmented base coat for maximum durability.

Also new in the solution coating field is Rohm & Haas' Acryloid AT-50, the new thermosetting acrylic polymer in organic solvents. It cures at standard baking temperatures, such as 300°F., to extremely hard, glossy films with high resistance to soap, detergents, and food stains. It has a high degree of cross-linking and develops excellent solvent resistance, resistance to printing and deformation. Applications for this new thermosetting polymer include white enamels on refrigerators, washing machines, air conditioners and the like.

One of the major reasons for the interest in water based emulsion systems for industrial finishing is the need to reduce fire hazards. Considerable pressure on the paint industry has come from the automotive industry in recent years to provide non-flammable systems and at least one commercial automotive primer is being applied from a water base system at the present time. It is hoped that water based topcoats may be introduced into the field in the next two or three years.

The need for non-flammable finishes has accelerated the development of water-based coatings for industrial primers and topcoats. The use of cinder block and stucco construction in the building field has accelerated the use of emulsion based exterior coatings since masonry surfaces are porous and highly alkaline. Acrylic emulsion systems give good holdout and resist alkali on these surfaces. They have given up to six years of service in these applications with excellent appearance.

In the field of polymer developments, Du Pont is exploring glycidyl methacrylate (GMA) copolymers and their possible commercial application. Preliminary investigation, revealed by Dr. J. A. Simms, at the Fall Meeting of ACS, Div. of Paints, Plastics, and Printing Ink Chemistry, is that a styrene GMA copolymer cross-linked with phosphoric acid is the basis of an appliance finish which is superior to alkyd ureaformaldehyde resin systems in such properties as hardness and resistance to discoloration and staining.

Alkyds

The use of alkyd base paints will rise only moderately within the next few years, predicted M. H. Bigelow of the Plastics and Coal Chemicals Division of Allied Chemical Corp. at the recent Chemical Market Research Association meeting in Chicago. By 1965 the volume of alkyd paint will rise to 440 million gallons compared to 1958's volume of 371 million of gallons. This will mean a consumption of 580 million pounds of alkyd resin in 1965.

Shortage of phthalic anhydride has naturally caused considerably uncertainty in the supply situation of alkyds, and even if the steel mills keep operating, it will take six to eight months to get a stream of basic intermediates such as naph-

thalene and benzene for further processing into phthalic anhydride, isophthalic acid, maleic anhydride, and fumaric acid.

Because of the phthalic shortage, manufacturers have been looking around for replacements. One possibility has been the use of isophthalic acid. B. Farber of Farnow, Inc. feels that it behooves the alkyd chemist to learn more about using isophthalic properly in order to obtain best results. For example, he points out the processing techniques for iso-alkyds are quite different than with straight phthalic anhydride alkyds. Isophthalic has a higher melting point than phthalic anhydride; it also contains an extra molecule of water per molecule of isophthalic acid. This means cooking procedures must be modified.

Using fatty acids, all the materials may be added and reacted at one time. However the reacting mass remains slushy until more than the half-ester is formed—a molecule of water must be released per molecule of isophthalic acid to achieve this half-ester. Chemists are using temperatures of reaction between 425°F and 575°F, and evaluating the speed of reaction and properties of the iso-alkyds formed.

Using oils, the iso-alkyds may be formed by two methods. One method is the acidolysis method, and the other is alcoholysis method.

In the acidolysis method, the isophthalic acid and oil are heated to a high enough temperature so that the isophthalic acid displaces part of the fatty acid in the oil, and a mixture is formed.

This reaction medium can take the polyol and yield a smooth reaction to make the alkyd desired without getting a heterogeneous mess.

In the alcoholysis method, the polyol plus an alcoholysis catalyst like litharge, plus oil are heated to 450°F for about a 30 minutes and checked for two to three to one solubility in methanol. When this is achieved, then the isophthalic acid is added, and the reaction is continued until the complete alkyd is formed.

In the way of new alkyds offered during 1959, the following new types are of interest:

ADM's Aroplaz 2580-X-60 is a short oil, non drying alkyd claimed to show unusual resistance to weathering that automotive finishes made with it will retain their original color and gloss for years. In addition to maximum weather durability, color and gloss retention, enamels and lacquers based on this alkyd possess high hardness and flexibility.

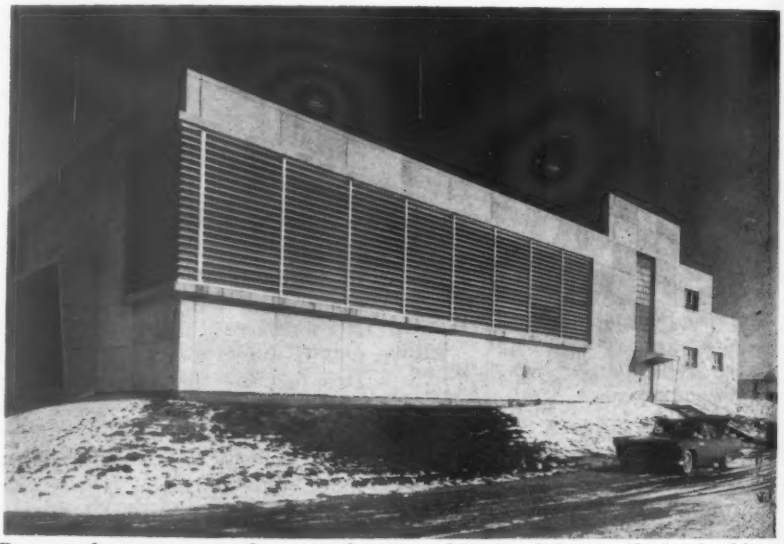
Another ADM product, Aroplaz 6006, is a pure oxidizing oil modified alkyd which sets tack free in about 5 minutes and hardens into a tough, glossy finish without baking. With this resin, industrial finish formulators can offer enamels with lacquer-speed dry. Recommended uses include finishes for farm and construction machinery, trucks, trailers, cabinets, metal furniture, toys, and automobile repainting.

Cellolyn 604 (Hercules Powder Co.) is a short-oil alkyd designed to be compatible with Parlon (chlorinated rubber) for formulating durable, low-cost industrial finishes.

Another product introduced by Hercules of interest to wood finishes manufacturers is Synthetics H82-60X, a non-oxidizing alkyd. This resin has the following features: water-white color, color stability, compatibility, print resistance, and sharp appearance after rubbing and polishing.

Important technological development in thixotropic alkyds this past year according to the T. F. Washburn Co., has been the new anticorrosive paints which give the same protective thickness with two coats—namely one of primer and one top coat—as was previously obtainable only with four applications of conventional paints. Tests and evaluations are in progress both by the Steel Structures Painting Council in Pittsburgh and Government agencies to determine the economic advantages of such paints which would reduce the number of coats necessary.

Another new and expanding field for thixotropic vehicles is its use as a modifier for pigmented petroleum resins to eliminate settling in membrane curing compounds or concrete curing compounds, and yet provide controlled flow and leveling. Other uses of these thixotropic vehicles are in traffic paints, marine paint, industrial "dip" paints and printing inks.



Butyrate lacquer was used to coat aluminum louvers of the ventilation building at Hampton Roads Bridge-Tunnel, Chesapeake Bay. After two years of exposure in a humid and saltwater atmosphere, the coating is claimed to have stood up well with no evidence of oxidation or discoloration.

Cellulosics

The raw material supply situation for nitrocellulose, as far as 1960 is concerned, is good. There does not appear to be any shortages in the picture.

The demand for nitrocellulose lacquers during the past year has been high. All applications have expanded along with the economy.

One of the more interesting aspects of this situation has been the unusual increase in furniture sales, and along with it the increase in the use of nitrocellulose lacquer. Ordinarily this industry shows a small increase from year to year, but last year's figures are somewhat startling.

One of the noticeable trends in

this industry has been towards the use of wood, rather than composition and other materials, for cabinets for stereophonic sound equipment. This has been coupled with a desire for the quality finish which lacquer supplies.

Conventional nitrocellulose lacquers have maintained their position as the most popular wood-furniture finish for a great many years, because they have excellent application and overall performance properties. Now another important characteristic is solvent resistance. It is now possible to formulate lacquers that will resist hot water, nail polish remover, alcoholic beverages, and other conventional solvents. They are fast air-dry finishes, and do not have to be baked like a synthetic. And the new lacquer retains all of its other outstanding characteristics, except spot repair.

Another new development which is expected to enhance the rapidly growing use of nitrocellulose-base multicolor lacquers in maintenance is the development in Hercules' Coatings Service Laboratories of a solvent system which eliminates the objectionable odor which has been a characteristic of many commercial multicolor lacquers.

Half-Second Butyrate

Lacquers based on half-second butyrate showed a steady growth in 1959, according to Eastman Chemicals. New applications, particularly for metal and wood finishing have contributed greatly towards the growth of these lacquers.

Of particular interest is the blending of half-second butyrate with converting resins such as amine and epoxy types. The advantage of such blends is that it improves the toughness of the film while maintaining fast drying. In the case of modification with butylated urea formaldehyde, appreciable isolublization of the coating takes place. Evidence indicates that cellulose acetate butyrate insolubilizes because of a cross linking reaction between the resin and the hydroxyl group of the cellulose ester.

Epoxies

The year 1959 has been a booming one for epoxy resin-based coatings. Once considered strictly specialty items, epoxies are now recognized as one of the most versatile basic materials available for coatings. Applicable in a wide variety of finishes, epoxies possess a unique combination of properties which yield high-quality formulations in a wide range of diverse applications. Wood furniture, metal products, maintenance, floors, marine, interior and exterior masonry, cans, drums, pipes, collapsible tubes are only a few of the many fields of use where epoxies have made tremendous inroads against traditional materials. The great interest in epoxy resins is a result of extensive development in the field and in the laboratory. Resin producers and paint formulators working together have arrived at the point where epoxy finishes have a proven performance record backed by innumerable successful case histories.



Masonry finishes based on epoxies are said to be waterproof and provide unlimited decorative possibilities.

This situation has helped to promote greater confidence in these relatively new materials.

The outlook for epoxies appears to be following a historic pattern for a basic industrial chemical—one of supply and demand. Can the epoxy resin producers supply the market? Are the raw materials used to produce epoxy resins readily available? These are questions asked by many formulators.

According to epoxy resin producers the answer is "yes". There is no supply problem on epoxy resins, as raw materials involved are not affected by steel strikes or other current negative influences that are hampering many basic supplies. Also, production facilities for the resins themselves are ample.

One of the most promising new applications of immediate interest is epoxy terrazzo flooring. Incorporating marble chips, this unique idea in surfacing permits thin, lightweight floors to be quickly installed over almost any sub-surface. In addition, epoxy terrazzo can be colored in light pastel and deep tones—a feature not possible with conventional terrazzo.

Trends in building and highway construction on a national scale will have a direct bearing on epoxy resin sales. Masonry coatings, factory flooring, highway surfacing, caulking and repair compounds and traffic paints are all end uses for epoxies that have current approval as well as great potential for the future.

Ciba has recently developed a new process to manufacture epoxy resins. Through a new technique, controlled molecular distribution is obtained which imparts lower surface tension to vehicles prepared from these resins. The advantages characterizing these resins made from this process as compared to conventional epoxies are: narrower and rigid specifications; elimination of batch-to-batch variation in both the resin and in the final coating formulation; improved solubility properties; improved clarity eliminating filtration.

Araldite 7071 and 7097 are two new epoxies manufactured by this process. Araldite 7071 is designed for use with amine type curing agents in room temperature curing systems; whereas 7097 is used with phenol-formaldehyde and urea-formaldehyde resins in baking systems.

Union Carbide Plastics disclosed a new method for the production of epoxy ester coatings at the recent Paint Show in Atlantic City.

Using only a liquid epoxy, ERL-2774, bisphenol A and any drying acid, the formulator now can prepare, in two simple steps, a varnish with preselected properties. This new technique is based on the preferential reaction of epoxy group with carboxyl groups before reacting with aromatic hydroxyl groups in a mixture where all three are present. By proper proportioning, ERL-2774, bisphenol A and a fatty acid can be reacted to produce an essentially linear epoxy of any desired chain length, terminated at each end by a fatty acid group. This intermediate compound is

then further reacted with fatty acid to produce the desired degree of esterification. Union Carbide Plastics claims that versatility of the method is pointed up by the preparation of rapid drying varnishes from resin esterified with semi-drying acids.

Application of 100%-solids epoxy coating systems can be simplified through the use of special curing agents developed by Shell Chemical Corp. Epon curing agents H-1 and H-2 eliminates the need for complex metering and mixing devices. Shell claims that these hardeners provide a usable pot life of several days.

Another development by Shell during the past year has been the formulation of two appliance



POWDERED PAINT: A new method of painting—using dry powder paint. Instead of volatile solvents that are normally used to make paint a liquid, the process uses heat and a flow of air. A metal object, like the spring shown above, is heated, then dipped into a container where a powdered paint is kept suspended in a cloud-like consistency by air flowingupward through the container. The heat of the object melts the dry particles of paint that touch it. Further baking smooths the coat of paint and gives high gloss.

enamels to satisfy the needs of the appliance industry for a one-coat appliance system. One enamel is based on an acrylic resin, the other on a new oil-free alkyd. Shell claims that the epoxy resin provides the proper adhesion and detergent resistance to enable both enamels to perform satisfactorily without a primer. Film properties of these one coat systems such as hardness, gloss, color retention, flexibility, and detergent resistance are said to be superior to conventional two-coat systems. Shell is also offering a low cost epoxy-bitumen coating which exhibits excellent chemical resistance properties. The bitumen material has a low viscosity, specially prepared to give compatibility with epoxy resins.

For curing epoxy resins, Heyden Newport introduced a liquid dicarboxylic anhydride (Beta S). This curing agent is claimed to be suitable for systems used in impregnating, potting, casting, laminating, tooling, and coatings.

Octylene oxide, a low viscosity chemical produced by Food Machinery and Chemical Corp., will reduce the viscosity of epoxy resins based on bisphenol A.

Some of the advantages claimed for the lower viscosity resin system are improved workability, higher solid loadings, better wetting, and increased pot life.

Tailored epoxy resins (three liquids, three solids, four solution of solids) were offered to the coatings field by General Mills under the trade name Gen Epoxy.

Hydrocarbons

In developing a projective view of the coatings prospects of hydrocarbon resins in 1960, consideration must be given to four major aspects which will develop the market position of these products, according to Andrew Schor of the Velsicol Corp. These determining influences are as follows: 1) The anticipated availability of these materials. 2) Present established applications of hydrocarbon resins and the retention of those markets. 3) Recent developments in new products and new fields of application which will increase the usage of hydrocarbon resins. 4) The economic climate that will prevail in 1960.

The commonly designated name "hydrocarbon resins" refers to resinous products classified by the U. S. Tariff Commission as "Coumarone-Indene and Petroleum Polymer Resins". Specifically, this classification covers relatively low molecular weight resinous products totally hydrocarbon in chemical structure. These low molecular weight resinous products are derived from two types of raw material stocks. The first of these two are monomer fractions from coal coking operations, and the second occurs as fractions from petrochemical cracking operations. Of the two, by far the greatest amount of resins derived from petrochemical operations are utilized in the coatings industry. With the increase in petrochemical operations, there have necessarily followed concurrent increases in the resin former fractions available to hydrocarbon resin producers.

This basic factor provides strong assurance that hydrocarbon resins will be in a favorable supply situation during the forthcoming year. In addition, expansions in productive capacity have been completed by the hydrocarbon resin industry to accommodate anticipated increased demands for these products. The quantity and quality of petroleum derived charging stocks and operating resin producing facilities clearly indicate a very favorable availability picture.

By intensive and detailed research activities, the hydrocarbon resin industry has developed specific classes of products differing in chemical structure. Predominantly aromatic, naphthenic and aliphatic resins are now being produced. Gradations exist in the degree of thermoplasticity and heat reactivity of the resin products. The greater degree of thermoplasticity is associated with those resinous materials having predominantly aromatic structure. Heat reactive properties are, for the most part, associated with those resins naphthenic or aliphatic in structures which are unsaturated.

In each series there are standard grades which vary with respect to softening point and color. These several grades provide the coatings chemist with a product specifically suited for a definite purpose.

The inherent chemical nature of the hydrocarbon resins has led to their wide-spread usage in such well accepted coatings as: 1) ready-mixed and aerosol type aluminum and gold bronze paints, 2) baking type metal coatings, 3) white pigmented concrete curing compounds, 4) trade sale interior paints. 5) wood and canvas preservative coatings.

The hydrocarbon resins possess a high degree of chemical compatibility with other film formers thus resulting in their use in the extension of phenolics, alkyds, coating type silicone resins and styrene copolymer resins.

The position of hydrocarbon resins is accepted and established in the above applications because they function better than other film formers of comparable cost. In the role of extenders they contribute to improve profitability while maintaining the desired degree of performance requirements of the coating. Upgrading improvements in the quality of hydrocarbon resins has enabled the hydrocarbon resins to keep pace with the demands of the coatings industry for formulating better products. Upgrading has resulted in producing resins of lighter color, better uniformity and improved odor. These continuing efforts have served to maintain the established applications of hydrocarbon resins.

To grow in usage, new application developments are necessary. Some of the recent developments in the technology of hydrocarbon resins include: 1) hydrocarbon resin emulsions for use in water thinned flat paints, 2) the utilization of hydrocarbon resins as extenders for styrene copolymer resins in traffic marking paints, 3) a high melting point (300°F.), light colored, highly reactive hydrocarbon resin which possesses interesting performance properties in baking type metal coatings.

Each of these application developments is directed toward a new market.

Stable hydrocarbon resin emulsions are available which can be used with acrylics, styrene-butadiene, and polyvinyl acetate latices in the manufacture of interior flat paints. In addition, recent laboratory reports indicate the possible usage of hydrocarbon resin emulsions with isophthalic alkyd emulsions. These hydrocarbon resin emulsions are distinguished by uniform small particle size and they display a very high level of pigment binding power.

It is of interest to note that very acceptable interior flat paints can be made using a hydrocarbon resin emulsion as the sole vehicle component.

Paints of this type have been in tests under commercial conditions of usage for the past nine months. The painted surfaces all show good color retention, and the surfaces are free from evidence of embrittlement. The above paint contains 1.4 lbs. of titanium dioxide per gallon. Other similar type water thinned paints have been prepared with PVC's as high as 75% and containing 1.33 lbs. of titanium dioxide per gallon. Even at this high PVC level, test panels pass 1200 scrubbability cycles.

The traffic marking paint market is one that is expected to grow. In using an aromatic type hydrocarbon resin together with a high styrene copolymer resin, very rapid drying paints can be formulated at attractive raw material costs. Such paints can be pigmented white or yellow and they show good coverage characteristics over both concrete or black top paved roads. Actual road markings have been made over both types of surfaces in several States during the past year. In this application, the hydrocarbon resin contributes both to the performance characteristics and to the savings in cost.

The new high heat reactive hydrocarbon resin will be of value in oleoresinous vehicles incorporating softer drying oils such as soybean oil. There is evidence of interaction between the resin and the drying oil component during the varnish cooking operation. Such vehicles can be applied to metal substrates either by roller or spraying techniques. The suggested baking cycle calls for a temperature of 400°F. for a period of 10 to 15 minutes. The baked coatings show good adhesion and chemical resistance characteristics. Suggested applications include appliance primers and drum coatings.

Looking ahead for future growth, the hydrocarbon resin industry is continuing its programs of research and development toward greater improvements and innovations. This is an area where the hydrocarbon resin chemist must work cooperatively with the coatings technologist toward a common goal.

Urethanes

While the current volume of urethane vehicles is small, not more than 500,000 gallons annually, estimates are that by 1965 growth of this particular vehicle is expected to be substantial reaching a volume of 6 million gallons.

During the past year, considerable activity was devoted to urethane technology in an effort to improve the coating properties of this vehicle. In this connection, two developments—pigmentation of urethane vehicles and the one-can urethane system are of interest.

Because of pigmentation problems, commercial acceptance of urethane coatings have been slow.

The main problem in the pigmentation is to keep the urethane vehicle from yellowing because of moisture on the surface of the pigment. Prepolymers containing free isocyanate groups, used either uncatalyzed or with small amounts of catalysts as the second component, are difficult to pigment because the water reacts with the isocyante group. In addition to the adsorbed moisture, other materials such as surface treatment chemicals and solvents will react with the high active free isocyante.

To help solve this problem, Spencer Kellogg and Sons have developed a method which will have the impurities react with the isocyante before adding the prepolymer. The method, known as slurry grinding, is accomplished by charging a ball mill or other closed dispersion system with pigments, enough solvent to make a slurry, and isocyante. These ingredients are intimately dispersed for a sufficient length of time to allow all reactions to take place. The prepolymer is then added and ground until the desired degree of dispersion is obtained.

A one-can urethane coating system was announced by National Aniline Division of Allied Chemical Corp.

In general, the one-can urethane coating is produced by polymerizing Nacconate 80, a diisocyante, with the alcoholysis product of a drying oil and polyhydroxy compound. Linseed oil may be transesterified by heating with glycerine to produce a mixture of mono-and diglycerides. These are in turn heated with Nacconate 80 until the isocyante groups are completely reacted. Conventional driers are then incorporated.

Preliminary testing indicates the one can systems show good resistance to weathering, have good gloss retention, resist mildew, and resist checking and cracking.

It is reported that all of these oil-based urethanes can be pigmented without difficulty. In general, pigment loadings in the order of 10-20% PVC are recommended. Nor-



New type of aluminum siding is coated with an enamel-like vinyl coating. Both sides of the aluminum are coated before forming. Coating is said to produce good appearance and weathering.

mal pigmentation methods have been found to be satisfactory.

Vinyls

Estimated sales of vinyl resin for paints and coatings for 1959 totalled more than 85 million pounds, according to H. W. Greenhood, market manager, Union Carbide Plastics Company, Division of Union Carbide Corporation. This volume was the highest in history and was an increase of 30 percent over 1958.

In a review of recent trends and developments in the vinyl coatings field, Mr. Greenhood noted the rapidly growing use of vinyl dispersions to factory-coat metals for computing machine and television cabinets, automobile dashboards, sections of automobile bodies and other applications. He said: "vinyl dispersions have fitted in well with the trend in recent years to automatic production methods. A metal coating operation can now be automated with significant savings in both time and money."

There are a number of metal processors who coat flat steel sheets with vinyl dispersions before fabricating them into finished forms. Last year U. S. Steel, after two years of market testing, offered vinyl coated steel in seven standard textures, but will produce any texture that can be engraved on an embossing roll, if there is demand for it. Color is strictly on a custom basis. U. S. Steel says this coated steel shows excellent scruff, abrasion, and stain resistance. Because of its mechanical toughness, the product lends itself to most common fabricating operations such as shearing, slitting, bending, punching, deep drawing, and roll forming. These coated plates can withstand a 30 percent elongation and may be bent as much as 180 degrees without impairment to the vinyl coating. The coating will last indefinitely, according to U. S. Steel.

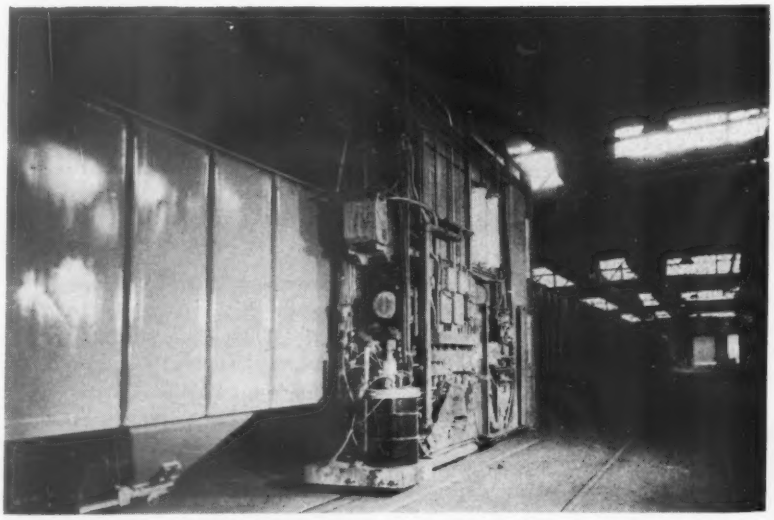
In the field of vinyl solution coatings, one of the significant changes has been the development of coating systems that can be used on rusty metal surfaces after simple wire-brushing. In the past, rusty structures had to be sand-blasted, an expensive and time consuming operation, before applying paint. The new procedure is particularly valuable in the coating of large metal tanks which are exposed to rain or other adverse weather conditions during construction.

An appliance finish based on cross-linked vinyl copolymer has had particular success in Canada. Canadian Industries Ltd. claims that half of the major Canadian appliance manufacturers have switched to this particular types of metal coating since it was introduced some 18 months ago. Known as "Dynakote" this finish has outstanding appearance and depth of gloss. It resists attack by detergents, soaps, ketchup, mustard, etc. No primer is required and the normal application is just one full coat followed by a bake equal to 30 minutes at 300 degrees F.

In recent months, Union Carbide Plastics introduced several new vinyl resins for industrial application. These are: VXBC, an experimental modified vinyl chloride copolymer which exhibits excellent adhesion to metal, light stability and tolerance for aromatic hydrocarbons; NXVC, available as a 40% solution in an aromatic hydrocarbon-ketone mixture, may be sprayed at higher solids content and higher aromatic solvent content than conventional resins; QXPA plastisol blending resin with conventional dispersion resins reduces plastisol viscosity; and BKSA-2750 is designed for formulating primers giving good adhesion between vinyl plastisol coatings and various substrates.

Silicones

There have been no outstanding developments in the field of silicone



Automatic spraying equipment applies vinyl coating on hopper cars at Pullman-Standard Manufacturing Company, Butler, Pa. Coating is said to show good weathering and chemical resistance.

resins for protective coatings in the past year. Use of silicones has been rising and current production by major suppliers is ample to meet all requirements.

General Electric's Silicone Products Department introduced a new silicone resin, designated SR-119. This resin is used in a special lens coating for indoor and outdoor flood lamps. Such coatings show good weathering, offers superior hot hardness, rapid cure and excellent adhesion to glass. Used as a lens coating, it is baked on the glass face of the lamp and is able to transmit more light output per watt for richer and truer color.

Polyamides

Olin Mathieson entered the polyamide field with the introduction Omamid resins. These resins are tough, amber colored thermoplastic of the polyamide type.

According to Olin Mathieson they impart true "built-in" thixotropic body to solvent or oil based coatings. They can be dispersed easily in a wide variety of vehicles including alkyds, oleoresinous varnishes, vegetable drying oils and modified drying oils. Their dispersion can be in the thinned vehicle, in the milling stage or resin cook. Any desired degree of thixotropy can be obtained by controlling the amount of resin added.

Coatings based on these polyamide resins show good pigment suspension and improved brushability, sagging and running are eliminated; flooding, floating and agglomeration are minimized.

Buton Resins

Buton resins (Enjay Co., Inc.) are thermosetting and drying materials which have several coating applications. Buton 100 is the basic raw material from which the other products are derived. This product is a styrene-butadiene copolymer of low molecular weight (8,000-10,000) having high unsaturation. Reacting Buton 100 with maleic anhydride improves pigment wetting and adhesion to metal. Buton 200 and 300 are modification of Buton 100. They have been heated to introduce polar groups, yielding products having good overall mix in compatibility with other coating materials. The solvent system is aromatic with isopropanol added to provide viscosity stability. Buton 300 is the more reactive of the two because of greater polarity.

Special Resin

Marbon Chemical has introduced 1100 TMV resin for multicolored paints and colored aluminum and one color coatings.

Multicolor paints made with 1100 TMV are said to be non-penetrating, washable, easily applied to any rough or smooth paintable surface. These paints do not require a special undercoat and are resistant to alkalies, mild chemicals, salt water, abrasion, fumes and mildew.

Other features claimed include outstanding stability in conventional cans and glass containers with no skinning and minimum settling.

Polyesters

At the Fall meeting of ACS, Div. of Paint, Plastics, and Printing Ink Chemistry, Shell Development demonstrated a new way to make tailor-made polyester resins, which consists of reacting monoanhydrides with terminal epoxides in the presence of tertiary amine to give a linear polyester.

Dr. R. F. Fischer of Shell Development said that within limits, this method can be used to make a linear polyester chain of any desired length, of known termination, and containing at regular intervals along the chain various substituents that can react further. The polyesters formed by this technique are colorless to tan, depending on the starting materials. With most epoxides, the products have been organic glasses.

A group of polyester resins (trade name Roskydol) manufactured by Farbenfabriken Bayer, A. G. is now being made available in this country by Naftone, Inc.

These resins are unsaturated, wax-free type polyesters which will cure either at room temperature or by baking. They can be formulated for clear or pigmented coatings and will give upon complete curing, high gloss, mar, abrasion, acid and light resistant films. Such coatings can be adapted for spray, or flow coater application and applied to wood, Masonite, chip board, masonry or metal surfaces.

Chlorinated Rubber

The extensive development program carried on in Hercules laboratores, and with the cooperation of several state highway departments, has resulted in the acceptance of new Parlon alkyd-type traffic paints on the basis of good abrasion resistance and durability, plus quick dry, good visibility, and ease of application. The performance of these traffic paints is expected to result in considerably expanded market for Parlon the coming year.

One of the larger uses for Parlon is in the field of maintenance paints, and the considerable attention given by industry to this problem is expected to continue to provide an ever-growing market for such paints. Parlon is known to be one of the most practical of the film-forming materials which is said to be unaffected by acids, alkalies, salts, moisture, and fungus growth. These Parlon paints are used on various metal, wood, and masonry substrates, as both interior and exterior coatings.

New formulas for Parlon-base paints, that provide high initial gloss and gloss retention, have spurred interest in the use of these paints in product finishing as well as in the more glamorous maintenance paints. The "own your own swimming pool" craze is expected to continue during the coming year. This will mean more and more Parlon-base paints being used for the new pools as well as "dressing up" old ones. Another new development is a concrete treatment, called "Tri-Kote," based on Parlon, which seals, cures, and hardens wet concrete in one application.

Water Systems

Architectural Paints

Not satisfied with the lion's share of the interior paint volume, latex paint manufacturers are looking outdoors in an effort to grab the exterior wood market which consumes 50 million gallons of paint annually.

In 1959 just a few companies marketed emulsion paints for exterior wood surfaces, but many more will enter the field this Spring as evidenced by the high interest in exterior emulsion formulation and test panel data offered by emulsion suppliers at the recent Paint Show in Atlantic City.

Among the emulsions, polyvinyl acetate and acrylics are the front-



"Blister House" in Du Pont Company paint laboratory where phenomenon of house paint failure through moisture blistering is studied. Exterior walls are kept cold while the interior is held warm and humid. This simulates chief cause of blistering which often takes place on frame houses during winter when interiors are heated and the atmosphere becomes laden with water vapor from such household activity as washing, showering and cooking. Under these conditions, moisture vapor migrates through wall from inside of house and becomes trapped behind standard oil-type house paints which do not "breathe," causing blisters. Panel section, lower right, shows the blister-resistant film adjacent to sections coated with oil paint and badly blistered under extremely severe conditions. Sap stain run-down is from ruptured blisters on panels bearing oil paint coats.

runners in the exterior race. Paints based on these emulsions are showing excellent promise on exterior new and previously painted wood.

Some feel acrylic emulsion finishes seemed to have a lead in this field of wood house paints at the present time since several major paint manufacturers have utilized them in paints which have been on the market for several years. Test marketing has continued over a longer interval. The Rohm & Haas Company exposures of paints of this type are somewhat more than six years old. These tests have included both panel tests and large scale house tests.

The emulsion paint panel members at Atlantic City agreed that latex paints give better appearance than oil paints, both initially and after several years of service. Fast drying speed, easy application and ease of cleanup also are very appealing to the do-it-yourself painters who comprise perhaps three-quarters of the total market.

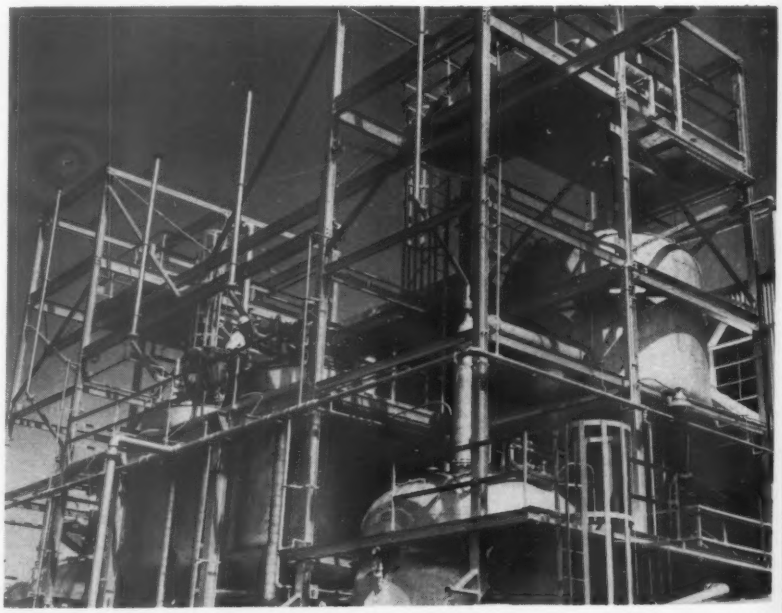
Latex house paint systems have excellent blister resistance and thus overcome one of the major problems of oil paints on wood. Emulsion house paints, however, do have some limitations in that thinner films are applied and an oil based primer should be used, particularly on bare wood surfaces which show heavy chalk. Surface preparation, particularly under the eaves, must be somewhat more complete than with oil systems or early peeling may occur.

According to W. H. Bromley of Shawinigan Resin Corp., the big problem with water based exterior systems has been the matter of painting over chalking oil surface. To help solve this problem, Shawinigan recently introduced a polyvinyl acetate surface conditioner. This conditioner may be used as a separate pretreatment before top coating, or which, in some cases, may be mixed directly with emulsion topcoat thereby making possible a completely water-borne system.

To play it safe, Dewey and Almy recommends that an oil or alkyd primer be used for previously painted surfaces in poor condition. On new wood, oil primers or latex primer containing lead acetate to sequester stains from the wood should be used.

Dow's approach to the problem of repainting chalky surfaces with Latex 2647 (acrylic type) is to add drying oils to the emulsion. Known as the "stir-in-oil-method," drying oils are simply stirred into the Dow Latex 2647. Such paint shows excellent adhesion over heavily chalked surfaces when used as the first coat in repaint work, according to Dow.

Paints formulated with Latex 2647 readily accept the addition of various types of oils and alkyds up to 20% wet weight or oil per weight of paint. Paddle mixing, performed by manufacturer, dealer or consumer, is adequate. Slight separa-



Facilities expansion of The General Tire & Rubber Company's Mogadore, Ohio chemical plant is shown in this general view of the new latex reactor area. The expansion provides for a 50% increase in capacity for manufacturing paint, and textile latices at the multi-product plant.

tion may occur on standing but a few stirs with a paddle will redisperse the modified paint to a uniform state. Samples checked after six months shelf aging are still in a good, useable condition, Dow claims.

To achieve a full measure of success in the exterior field, most industry observers feel that the combination of primer and topcoat in one package is a must. Only in this way will water-based exteriors afford the same ease of application with respect to a number of coats and surface preparation as the oil-based variety.

A further development of interest in exterior latex paints is National Starch's new vinyl-acrylic resin that is compatible with both zinc oxide and leaded-zinc oxide pigments. Both interior and exterior latex paint can be formulated with this new resin (Resyn 25-2253). National Starch feels that exterior formulation would benefit markedly from the many desirable properties imparted by the zinc pigments, including excellent opacity to ultra-violet light, good cleansing and color retention qualities and lasting resistance to mildew.

Union Carbide Plastics' WCX-140 is an internally plasticized vinyl-acrylic latex which is said to produce films of good clarity, gloss, flexibility, and waterspot resitance. It is recommended for preparing semi-gloss enamels, wall-board primer-surfaces, flat wall paints, exterior masonry paints, high PVC soft-board coatings, and baking coatings.

Another vinyl-acrylic copolymer emulsion was recently introduced to the trade by the Thibaut & Walker Company. The presence of acrylate groups in the polymer chain impart resiliency and toughness which allow for superior washability and longer durability, according to Thibaut & Walker. This emulsion is stable to borax, and its high mechanical stability and high tolerance for metal ions allow a wide choice of additives in formulating paints.

During 1959 a new emulsion, (Rhoplex T-123) by Rohm & Haas, was introduced which provides exceptional flow and leveling characteristics, even at high viscosities in acrylic emulsion systems. Excellent flow properties can be obtained at viscosities as high as 100 Krebs Units. Color rentention, drying speed, adhesion and other properties are similar to the acrylic emulsions now in commercial use. It is expected that this emulsion will broaden considerably the application of acrylic polymers in interior painting systems. It is hoped that these same flow properties can be extended to semi-gloss coatings and floor paints in the near future.



In this dipping process, Ford Thunderbirds are run through underbody primer based on styrene-butadiene latex.

Industrial Coatings

In the industrial field, there is a growing trend toward the use of water dispersed systems for factory applied coatings. Polyvinyl acetate coatings are now used as the primer and finish coat for acoustical tile and cedar shakes. In the area of metal finishes latex systems are being used more and more extensively. Some are of the opinion that the three available emulsion types—styrene-butadiene, polyvinyl acetate and acrylic—are not the answer to the successful development of emulsion systems for metal. For example, Shawinigan researchers are working with new monomers to produce unique polymers and copolymers to attain suitable properties for metal finishes.

However, a new concept in polyvinyl acetate copolymers for metal finishes was developed by Colton Chemical Company in their Flexbond Experimental E-3 Emulsion. This emulsion is a polyvinyl acetate polymer which will cross-link with heat to a very high degree of solvent insolubility. Colton claims that clear films of this emulsion becomes 98% benzene insoluble after a bake of 150°C for ½ hour. In addition to its ability to cross-link with heat, it also develops good adhesion to not only phosphate treated steels, but to regular cold rolled steel. Its adhesion to cold rolled steel, after baking, is comparable to solvent based finishes. The polymer is being released to the paint companies for their own investigation.

Success in using acrylic emulsion systems for metal has been achieved by Rohm & Haas with Rhoplex AC-200. When baked, films of this thermosetting acrylic emulsion polymer show excellent hardness, impact resistance, adhesion, gloss, and resistance to water and chemicals, according to Rohm & Haas. Other features claimed are good color properties, chemical stability, and durability. Suggested applications for pigmented coatings include top coats and primers for automobiles, appliances, steel drums, machinery and metal furniture; clear films are recommended for protecting surfaces of metals such as chrome, aluminum, bronze, and brass.

Another area where emulsions are being investigated is the wood finishing field. N. R. Peterson, manager of Coatings Technical Service of the Dow Chemical Com-

pany refers to the current work going on in Dow's research laboratories on clear latex finishes and latex stains, but readily emphasizes that they are not available at the present time because the final design of polymers for these particular applications is not yet accomplished to Dow's satisfaction. As far as future technology in latex field, is concerned, Mr. Peterson sums up the situation this way:—

"The demands which industry and construction make upon the paint industry are incessant. Faster dry, easier application, simpler clean-up, better durability, lower cost all are asked. As our understanding of latex behavior increases, latex paint market needs will be answered with the design of ever more efficient latexes."

Last year saw considerable activity in developing water-soluble system for industrial application. Spurred by such products as ADM's Arolon 1000 and the use of Amoco's trimellitic anhydride for synthesizing water soluble resins, producers are currently test marketing new systems.

One such system is a water soluble melamine-acrylic resin developed by American Cyanamid, known as Melaqua 600. When baked this enamel film is said to exhibit good flow and levelling, high gloss, and clearer and brighter colors than solvent enamels with the same pigmentation. Only pigment and water need be added to the resin to produce a ready-to-spray enamel. Recommended baking schedule is 30 minutes at 300°F.

Another system is based on the reaction of a specially-blocked isocyanate and an amine bearing resin in an aqueous solution, developed by Mobay. Advantages claimed for the new one-component systems are a high order of chemical resistance, good adhesion to metals, good flexibility, ease of formulation and application, non-toxicity and non-inflammability properties, and reduced cost.

In formulation, the blocked isocyanate is used in a concentrate of polyamide resin and an emulsifier. Water is added and the composition is then blended by agitation. Colors are achieved by merely adding pigment to the concentrate during agitation. Curing is accomplished at normal bake temperatures.

S.C. Johnson recently announced the use of diphenolic acid in a bake finish on metal utilizing water as the sole solvent. The system, in addition to the advantage of utilizing water as the solvent, has been found to have the following advantages: it cures rapidly at a bake temperature at 250°F in 20 minutes; the films are resistant to water, salt-spray, grease and detergents; the films show good adhesion to unprimed metal; and the films when properly pigmented are smooth with high gloss. Limitations are: the films are not suitable for white enamels and a certain amount of formaldehyde is evolved during the cure.

A water soluble, chemically modified vegetable oil vehicle (Kelsol 1209) for industrial metal baking primer was recently developed by Spencer Kellogg and Sons.

This vehicle features formulation versatility; is easily to pigment; it can be used to formulate primers for spray or dip application and exhibits good adhesion, and excellent enamel hold out.

Solvents

At the present time, petroleum solvents are in plentiful supply with very few exceptions. There is no scarcity at all in aliphatic petroleum naphthas and none is expected. Cyclohexane, one of the few naphthene solvents, seems to be in somewhat short supply due to its use as a raw material for nylon. Also, due to its chemical end use, benzene seems to be in somewhat short supply. This situation is due not only to good activity of benzene consumption, but also because of the steel strike curtailing supply. Toluene and xylene are in good supply since these solvents are petroleum derived. Increased usage of xylene isomers in chemicals is expected but this will not have any appreciable effect on the supply situation. Heavy aromatic solvents should continue to be available in good quantities. Additional capacity has gone on stream during 1959—on both aliphatic and aromatic production to insure continued adequate supplies in 1960. The only exception may be benzene which will continue in short supply, at least for the early part of 1960.

Important technological developments continue to take place in this field. These fall into classes: 1) improving the solvent for closer control, 2) learning more about the solvent usage, and 3) adapting solvents to new resins.

The improvement of solvents has been confined to narrowing the boiling range of mineral spirits fractions and also improving the odor where possible. Mineral spirits solvents have been developed with a lowered end point which is finding interest in the paint and dry cleaning fields. There has been quite a trend toward replacing odorless solvents with low odor products. Low odor solvents are normally derived from selected crudes. The latter change has taken effect because odorless solvents are not as compatible with most resins and also because of lower prices on low odor mineral spirits.

For many years new resin developments have taken the emphasis off solvent usage. Even though new resins are still being developed, cost conscious solvent users are now taking a new look at solvent usage. They realize that since the solvent represents as much as 40 percent of the total formula, there is a cost reduction possibility here. By delving into solvent characteristics, various solvent suppliers are providing information and data on new approaches to solvent usage. Recent investigation has established that proper solvent choice directly or indirectly affects shelf stability, paint consistency, tinting strength as well as such properties as sagging, wet edge and levelling. This information is of help to the user in lowering the solvent cost of many paint formulae.

The consumption of solvents is closely tied to the resin field. New resin developments mean that solvents must adapt themselves to these new materials. For example, new acrylic formulations for automotive finishes hold promise to increase the aromatic usage at the expense of costlier types of solvents. Automotive finishes, high in melamine content, are occasioning an additional demand for purer high boiling aromatics.

In recent months, a great deal of research is going on to introduce water emulsion coatings into industrial applications wherever pos-

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sible. To some degree, this reduces the need for solvents in these particular uses. The same is true of the solventless systems. On the other hand, as the new year opens, there is much talk about a new air-dry alkyd. While it is too early to ascertain its possibilities, it will undoubtedly increase the need for faster evaporating petroleum solvents, if such a product is commercialized.

1960 will see the introduction of many modified resins with their accompanying needs for different types of petroleum solvents. This will mean that the industry must modify its products to insure the best performance of many coatings, though it will place unusual and exacting demands on petroleum solvents. Despite the development of solventless coatings and water emulsions, American Mineral Spirits predicts that total business activity of 1960 should lead to the biggest year yet in the use of petroleum solvents.

Pigments

While most pigments are in good supply, shortages in certain types are likely in the event of a resumption in the steel strike. These include the phthalocyanines, beta naphthol, which are dependent on naphthalene for their manufacture.

Colors

Continued use of color in all types of paints has spurred pigment suppliers to develop new and improved pigments to meet the exacting demands of paint manufacturers. For example, trends in trade sales and in automotive and product finishes in recent years has been toward brighter colors. In addition to being bright these colors must be light-fast, resist weathering and heat, and be chemical resistant. Moreover they must have good dispersing properties to facilitate their incorporation into all types of solution and aqueous coatings.

Last year saw the introduction of many new and improved pigments embodying the characteristics listed above.

One of the major developments in phthalocyanine pigments was new yellow shade of phthalocyanine green developed by General Aniline's Dyestuff Division. Heretofore, yellow shades of green were possible only by mixing yellow and green pigments to obtain the proper shade. This pigment, known as Heliogen Viridine Y, is claimed to be the yellowest green pigment available. It has high-tinting power and is stable to organic solvents, acids and alkalies.

Improvement in phthalocyanines was also accomplished by American Cyanamid. In their Cyan Blue GT 55-3295, which is a green shade of phthalocyanine blue pigment. Cyanamid claims this pigment exhibits good dispersing properties, excellent acid and alkali stability, lightfastness and durability.

Activity in the fluorescent field was also noted in 1959 with both Lawter Chemicals and Radiant Color introducing new lines.

Lawter's eight brilliant fluorescent colors (HiViz) are said to be finer and possess more uniform particle size, and show increased resistance to solvents and plasticizers. These pigments may be used for toning non-fluorescent colors to produce new and brighter shades of regular paint lines.

Radiant Color's Velva-Glo line is available in eight shades. Produced in finely ground size, these pigments will show a Hegman reading of 5.8 in dispersions without further milling. They may be used as toners for conventional pigments. Velva-Glo pigments have good resistance to aromatic and aliphatic hydrocarbon, according to the manufacturer. Use of esters, ketones and alcohols are not recommended.

Other recent developments in colors include: Interchemical's (RBH) yellows, royal maroon, aurelian bronze available in dry pigment, press cake, and dispersion; new ming oranges in medium, dark and extra red shade by Kentucky Color; Metals Disintegrating's new gold and bronze metallic colors with added brilliance; Mineral Pigments' tinting vehicle common for both organic and inorganic pigments with paste compatible with all latex emulsions, linseed oil, alkyds, nitrocellulose and acrylic lacquers, Pliolites, etc.; Sherwin Williams' primrose shade yellow pigment, strontium chromate 12170 for metal protective coatings, is claimed to have low reactivity in catalyzed epoxies; fluid toner colors for polyesters developed by Sherwin Williams are dispersed in reactive monomer and their low viscosity permits them to be poured into a resin mix with a minimum of effort.

Zinc Pigments

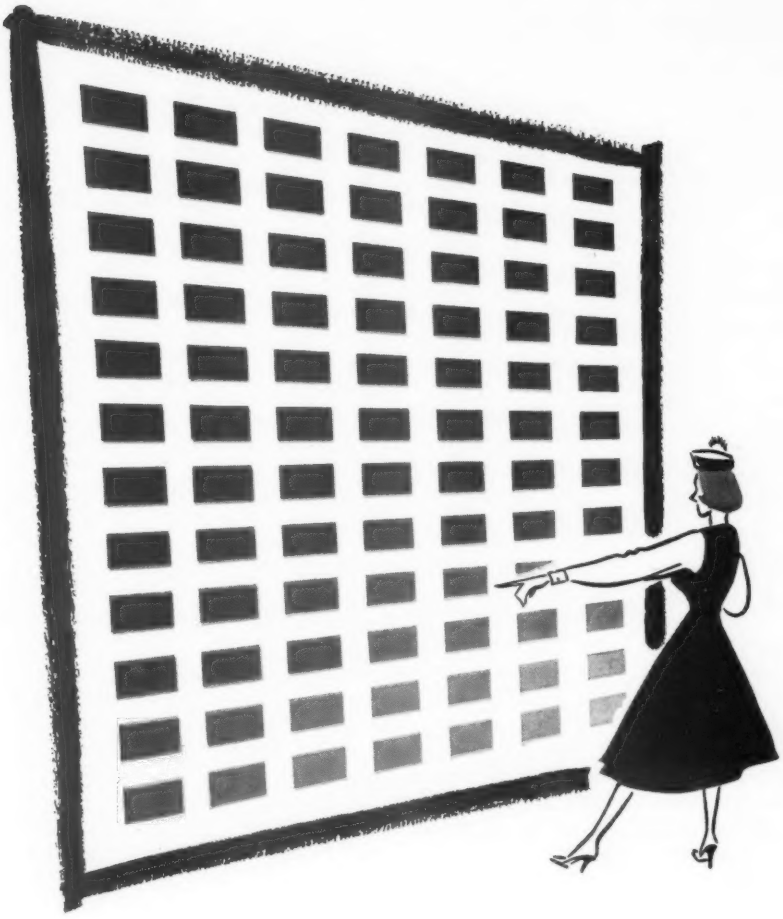
Total industry shipments of lead-free zinc oxides during 1959 are currently estimated at about 180,000 tons, as compared to about 155,000 tons in 1958. Of this quantity, approximately 17,000 tons, or nearly 10%, will be supplied by imports.

Industry shipments of leaded zinc oxides during 1959 are currently estimated at about 25,000 tons as compared to 23,000 tons in 1958, all of which is supplied by domestic producers. The paint industry normally consumes substantially all of the leaded zinc oxide and about 22% of the lead-free type, so its consumption of these pigments increased 17% (lead-free) and 9% (leaded) over 1958.

During the past five years a trend developed which led many paint manufacturers to reduce or eliminate lead-free and leaded zinc oxides from their formulations. Accordingly, domestic producers of these pigments, individually and collectively through the American Zinc Institute, began a research program, which included nationwide cooperative test fence exposures, designed to demonstrate to the paint industry the desirability of including zinc oxides, lead-free or leaded, in their formulations. This work was also extended to include emulsion paints of various types, and there is every indication that these pigments will find increasing usage in quality paints, both of the conventional and emulsion types.

Consumption of leaded and lead-free zinc oxides during 1960 is expected to equal or slightly exceed 1959, and supplies of both will be adequate.

The use of zinc sulfide by the Paint Industry has been one of consistent decline during the past five years. Although no accurate figures are available, it is estimated that no more than 200 tons of zinc sulfide per year are now used in protective coatings, and it is used mostly for its chemical rather than its pigment properties. No great change is anticipated in this picture for 1960, since no new uses for this



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pigment appear to have developed.

Similarly, the use of lithopone in protective coatings has declined and is now stabilized at a rate of about 15,000 tons per year. The use of this pigment is now confined mostly to specialties, such as porch and deck finishes and some types of traffic paints. Here again no great change is envisioned for 1960, and present productive capacity appears adequate for the demand.

St. Joseph Lead recently made available a series of zinc oxides which feature improved wetting and dispersion properties. Dispersion of these zinc oxides in house paint vehicles will give a Hegman reading of 4 in a Cowles dissolver in less than one minute, the company reports.

Extender Pigments

Volume consumption of extender pigments in the past has been gradually upward with no surprisingly sharp breaks in the growth curve. Most extender pigments are mined products which have been available for some time. No shortages are likely within the next year. As with any mined product which is not further chemically processed, quality is a variable which must be watched and is, in fact, receiving considerable attention by major extender suppliers.

The supply of dependable, good quality extenders should, therefore, be available in 1960.

Since there has been a trend in the paint industry toward pure dispersion of pigments rather than grinding, extender manufacturers have been providing finer grades having a more carefully controlled particle distribution. This trend in the industry will continue to lead toward production of finer inerts having specific and well defined particle size distributions. The prices for finer extenders will generally be higher, reflecting higher processing costs on the part of the extender supplier. Other new developments which are not strictly within the category of extender pigments are the introduction of what might be called "functional" pigments. Some of these new, very fine synthetic pigments will be used, for example, for flatting clear finishes, controlling the flow properties of certain paint systems, and preventing flooding and floating. Some work is being done on functional pigments to influence the chalking rate in exterior finishes.

Extender pigments are one class of paint constituent which offer opportunities for both economy and improving quality in paint manufacture. Because the total number of extenders manufactured for paint use is large, a complete analysis of all of their characteristics is not available and would be very difficult to assemble. However, further economy and improved paint performance could be achieved by a paint manufacturer if such information were available to him. There are many characteristics besides those conventionally reported of bulking value, oil absorption and color. Particle shape, for example, affects film strength and gloss. Hardness has an effect upon scrub resistance. UV adsorption characteristics can very well have an effect upon durability and tint retention in colored paints. In the event of a future economical squeeze or step-up in competition among paint manufacturers, a better knowledge of these other qualities of extender pigments may become important to the paint manufacturer. Closer control of costs or achieving that marginal improvement in performance which permits maintenance or increase in business volume may depend, at least in part, upon how carefully the proper extender pigment has been selected. Most extender pigment producers know the strong points of their products and will gladly cooperate to provide such information concerning their products.

Aluminum Silicates

With regard to the expected supply situation of the calcined and hydrated aluminum silicates, it is now expected that both of these materials will be in sufficient supply for the coming year, according to Georgia Kaolin. Earlier this year the supply of calcined aluminim silicates were somewhat short; however, this has been alleviated.

In the past year one of the most interesting technological developments has been the introduction of surface modified hydrated aluminum silicates. These materials offer to paint formulators an entirely new field. In the past the hydrated aluminum silicates have been considered to be a hydrophilic type pigment, in that they are wet with water more easily than with oil. However, by proper modification of the surface it is now possible to obtain a much more hydrophobic type of surface. This permits the advantages of the hydrated aluminum silicates to be used in numerous other fields, such as the oleoresinous type paints. It is anticipated that further developments on these lines will be available and will offer a new approach to pigmentation problems.

The hydrated aluminum silicates, because of their excellent compatibility with water, have found increasing application in the water base, latex type of paints. Also, the calcined aluminum silicates have been of particular interest in this field. Because of the greater trend toward water base paints, more and more formulators will be looking to the calcined and hydrated aluminum silicates for improved pigmentation systems. With the recent development of exterior latex paints, an entirely new field is opening up which will greatly expand this type of paint.

Exposure studies have shown that the advantages obtained with the hydrated aluminum silicates in the interior water base paints also hold for the new exterior latex. It is anticipated that the use of the hydrated aluminum silicates in exterior paints will increase with greater acceptance of the latex type paints in this field.

The hydrated aluminum silicates have been used in industrial primer systems. It is believed that this will be further increased with the introduction and expansion of the water primer systems. Studies in this field have shown that hydrated aluminum silicates to offer a number of advantages.

A great deal of research is currently being done and will continue to expand the markets of the hydrated and calcined aluminum silicates.

Magnesium Silicates

In the field of magnesium silicates, International Talc has recently made available a product, "Asbestine 625", which according to the manufacturer has controlled particle size distribution. The

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average particle size is 5.0 microns. Some of the interesting properties claimed for this extender are: good white color, good suspension properties, inert chemically, is a stir-in pigment, imparts film toughness and adhesion, aids in flatting, exhibits improved sanding properties.

Driers and Additives

In analyzing the trends and developments in paint driers and additives, one must take into account the tremendous impact that water-thinnable paints are making in both the architectural and industrial fields.

It is very clear by now that the water thinnable paints—styrene-butadiene, polyvinyl acetate, acrylic, etc. have obtained, and will continue to enjoy, a very sizeable portion of the coatings industry. This is especially true of interior decorative coatings, though they are also being used extensively for exterior surfaces based on cement, stucco, concrete, etc. Industrial finishes are also beginning to feel the impact of the water thinnable paints with one large automobile manufacturer using one type as a primer over steel, and with other uses as prime and finish coats on many types of industrial products, coming to the fore.

As a result of these trends, the use of standard types of naphthenate, tallate, and octoate driers has appreciably gone down, and will probably continue to go down as these water thinnable paints take a larger and larger slice of the paint market. This has been partially, though by no means completely, offset by the introduction of the water dispersible and emulsifiable driers for use in the water thinnable paints. The reason why these driers can be no means completely offset the loss to the oil based paints is that most of the water based paints require little or no drier. Those paints based completely on vinyl or acrylic, with no double bond to satisfy, receive little or no benefit by the use of driers. The only ones that do stand to benefit are the styrene-butadiene types and those vinyls and acrylics that have oil or alkyd modifiers. Those paints that do have such modification, normally require sufficient drier to take care of the modification—a considerably smaller amount than would be required by the oil and solvent based paint they have replaced.

As regards the supply situation of the raw materials used in the manufacture of driers, there seems to be, for the present, no real shortage. Naphthenic acid is in somewhat tight supply but adequate for present requirements. Tall oil, 2-ethyl hexoic (octoate) and fatty acids seem to be in adequate supply.

Whereas driers seem to be going down in demand, additives, bactericides, and fungicides are definitely on the upswing. This again is largely due to the astonishing growth of the water paint field. Every gallon of such paint requires the use of a bactericide. All such paints that are being applied on exterior surfaces requires the use of a fungicide or mildew inhibitor. Solubilized phenyl mercuric acetate has been found to be most effective for both, and its use has shown a large increase.

Other additives that have become popular in water thinnable paints are thickeners, coalescing agents, anti-foaming agents, anti-rusting agents, freeze-thaw stabilizers, dispersing and deflocculating agents, emulsifying agents, wetting agents., etc. Each formulation will contain not one, but many of these additives. This has created a new field for additives in the coatings industry that never existed.

Not to be outdone by water paint, manufacturers of solvent based paints are finding many uses for additives that are designed to either give the paint specific properties or to correct or improve properties in which the paint might be failing. There are additives that will reduce or eliminate mildew and fungus growth on all types of surfaces; that will increase viscosity or lower viscosity; improve flow and levelling or reduce flow and levelling; induce thixotropy; reduce or eliminate settling and caking; reduce or eliminate flooding, floating, and silking; materially reduce raw material costs without impairing quality by permitting the use of large quantities of water as a diluent; eliminate sagging tendencies without effect on gloss or viscosity; reduce grinding time and improve fineness of grind for hard-to-grind pigments; reduce and eliminate skinning tendencies; etc. One of the newest developments that shows great promise is a liquid bodying and puffing agent that can be added to low pigmented alkyd enamels and increase their viscosity without impairing other properties—in fact it seems to somewhat improve gloss and drying rate.

The supply situation on raw materials used in manufacturing these additives is quite adequate to take care of all the above uses. This can spur the development and increased use for these types of products.

The steady growth and use of additives in the coatings industry has been largely due to the fact that it has made the life of the formulator and production men a little bit easier. Thus, instead of being forced to reformulate a coating, with the attendant dangers of changing other properties, when a certain property in a coating is desired, the formulator simply uses an additive specifically designed to give this property; or if a factory batch is off standard, an additive can usually be added to bring it up to standard.

New Developments

Water solubile driers (Meletex) for water dispersed paints was made available by Harshaw. These driers exhibit the following advantages: highly dispersed, compatible with all latex and pigment dispersion system, free of volatile solvent, easily incorporated. Manufacturer claims these driers impart increase scrub resistance of dried finishes, increased hardness, improve resistance to water spotting, improved resistance to mineral spirits, improved gloss and color retention of baked films, freedom from pinholing and pitting.

Aluminum Chelate PEA-1 (Harshaw Chemical) is a chemically modified aluminum isopropylate recommended for curing epoxy resins, for modifying phenolic resins to improve hardening characteristics and solvent resistance at reduced temperatures; for modification of drying oils and alkyd. In the case of aluminized alkyds, improved film properties such as higher impact strength, mar and scratch resistance results. Drying oils from chelated aluminum alcoholates have good viscosity sta-

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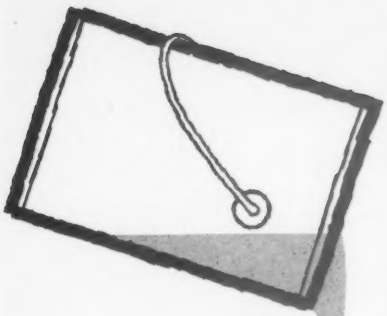
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bility, do not skin even with large excess of drier, the films are brittle and it is suggested that they be blended with natural oils, adhesion and gloss are good, water sorption and heat resistance are outstanding, water sorption and heat resistance are considerably improved.

Kromosperse, developed by Nuodex, is a dispersant with a wide range of compatibility. This product is said to offer economic advantages in plant color shading operations, making it possible for a single tinting paste of each color to supply the necessary colorants for most paint systems. This dispersant also offers advantages for color machines or tube systems, which are presently in demand at the retail level. According to Nuodex, a single paste of each color is all that is required to produce the desired shade in all formulations, interior or exterior, aqueous or solvent.

Two other products offered by Nuodex was Nuodex AF-7 and Nuvis LB. Nuodex AF-7 is a water-base paint anti-foaming agent which is said to eliminate handling with no settling or phase separation. Nuvis LB is a viscosity control agent which allows flexibility in handling viscosity problems.

Advance Solvents & Chemical introduced a concentrated solution of phenyl mercury acetate. Advacide PMA contains 18% mercury as metal and is designed to give maximum resistance to putrefaction in the container and resistance to mildew on the dried film.

Plasticizer Surfactant #77, and #99 (Advance Solvents & Chemical) is a nonionic polyester for polyvinyl acetate and styrene-butadiene emulsion paint systems.

Metasol 57 in a premeasured water soluble package was recently made available by Metal Salts Corp. Package of this mildewcide-preservative can be added directly without opening. It will quickly dissolve in water, leaving the mildewcide free to disperse throughout the system.

Pyrrolidone type dispersing agents (Antara Chemicals) have been found to be effective as a dispersing agent for pigments in lacquers and also to impart softness of grinding properties to pigments when ground on conventional types of grinding equipment.

Under normal conditions pigments used for coloring lacquers must be first ground, usually on a three roller mill, in a suitable plasticizer, and then finally dispersed in the lacquer by ball milling for 16 to 48 hours. Antara claims that mechanical grinding can be accomplished through the use of a good electric stirrer and a minimum of ball milling with the use of these dispersing agents.

The problem of deleafing of aluminum pigments in alkyd-base aluminum paint has been solved through a special stablizer developed by the Aluminum Company of America. Called Alcoa Stabilizer No. 5, this additive makes possible ready-mixed paint formulations with acid values up to 28. According to Alcoa, only a few ounces of the additive per gallon of paint are needed.

Improved corrosion resistance against salt water and salt water spray and improved durability are other advantages claimed for this additive.

Acknowledgement

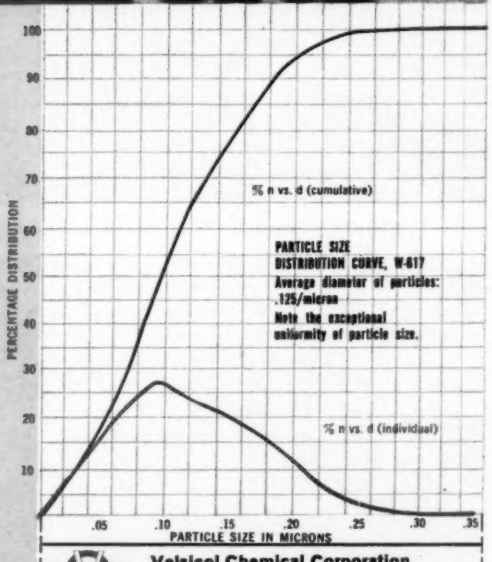
We acknowledge the cooperation of the following who submitted information and data for use in this article:

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H. A. Wakefield—Imperial Color Chemical & Paper Corp.
J. R. Yeager, Mgr., Nitrocellulose Sales, Hercules Powder Co.



. . . W-617 improves emulsion paint quality, cuts raw materials costs! The electron micrograph behind the young lady shows why millions of Americans can become expert painters, and can afford to paint more often. It shows the spherical configuration and uniform size of resin particles in Velsicol's W-617 emulsion paint base. W-617 is a water emulsion of light colored thermoplastic hydrocarbon resin. It can be used as a complete vehicle, or as an extender for acrylic PVA or styrene butadiene latices. Either way, it enables paint manufacturers to formulate smoother, more appealing emulsion paints at lower cost.

The average diameter of W-617 resin particles is .125/micron. Natural rubber latex particles have an average diameter of .600/micron. Latices and emulsions of small particle size have more binding power. They will take higher pigment or filler loadings without losing film strength. Penetrating characteristics are improved. The uniform size of the dispersed resin particles increases film smoothness. W-617 is one of several new products of Velsicol research that are now available in commercial quantities. All of these products were developed specifically to improve the quality and lower the raw materials costs of "best selling" paint formulations. To find out how they can be used in your formulations, see your Velsicol representative, and write for technical literature.





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A LOOK INTO EASTMAN'S NEW COATINGS LABORATORY





Common weighing area in the sales development laboratory.



Sales service laboratory. At right is the lab office. The hood and weighing center on left act as a divider for the room.

IN recent years the chemical supplier's technical service laboratory has become an important factor in the development and progress of the paint industry. Without a smooth operating technical service laboratory, it would be practically impossible for chemical manufacturers to do business in the paint field. There is no doubt that the technical service laboratory provides a vital link between the supplier and his customers. It is particularly valuable to the many customers who have small technical staffs and limited laboratory facilities and who depend, in a large measure, on their suppliers for formulation suggestions, solutions to application problems, specialized testing procedures, etc. With competition always present, with the introduction of new raw materials and application methods, and the constant pressure for lower product cost while maintaining quality, the paint manufacturer looks to his supplier for help.

For effecient handling of these problems, chemical manufacturers have invested heavily in well-staffed and well-equipped surface coating laboratories. These laboratories offer their customers the benefits of experience and know-how associated with paint technological problems.

A typical chemical firm whose many products find their way into protective coatings is Eastman

Chemical Products, Inc., a subsidiary of Eastman Kodak Co., Kingsport, Tenn. Just recently, Eastman has completed a new surface coatings laboratory designed not only to give their customers the best in technical service, but also to carry out applied research in the field of protective coatings.

For several years Eastman has been selling a variety of products to the protective coatings field. These include solvents, plasticizers, cellulose esters and intermediates. With the introduction of half-second butyrate in 1953, Eastman made available to coatings manufacturers a unique film-former having properties of interest to manufacturers of wood lacquers, metal coatings, clear metal finishes, plastic coatings, cloth coatings, paper coatings, hot melts, adhesives, leather coatings, etc.

Typical of new materials, use of half-second butyrate was very limited in the beginning. However, within the last two years, consumption of half-second butyrate showed a steady upward trend, and more recently this growth curve has taken on a decided vertical profile.

Undoubtedly this increased use in half-second butyrate can be attributed, in some measure, to Eastman's technical service laboratory where customers' problems involving half-second butyrate are solved and new ideas emerge.

The compounding of today's protective coatings entails an empirical approach. Literally hundreds of chemicals are used in the formulation of coatings. A particular coating may contain a dozen or more components and each individual component plays an important part in the performance of this coating. Coping with formulation problems often requires the services of coating specialists whose knowledge of the properties and characteristics of these components are most important in the successful application of a particular coating. Employing this approach, Eastman's specialists have been an invaluable asset to both users and potential users of half-second butyrate.



Oven and degreasing equipment area divide sales service laboratory and sales development laboratory.

Eastman's new coating laboratory in Kingsport, Tenn. is divided into three sections: the emulsion laboratory, sales service laboratary, and sales development laboratary.

The emulsion laboratory is concerned with projects relating to floor waxes, latexes, etc.

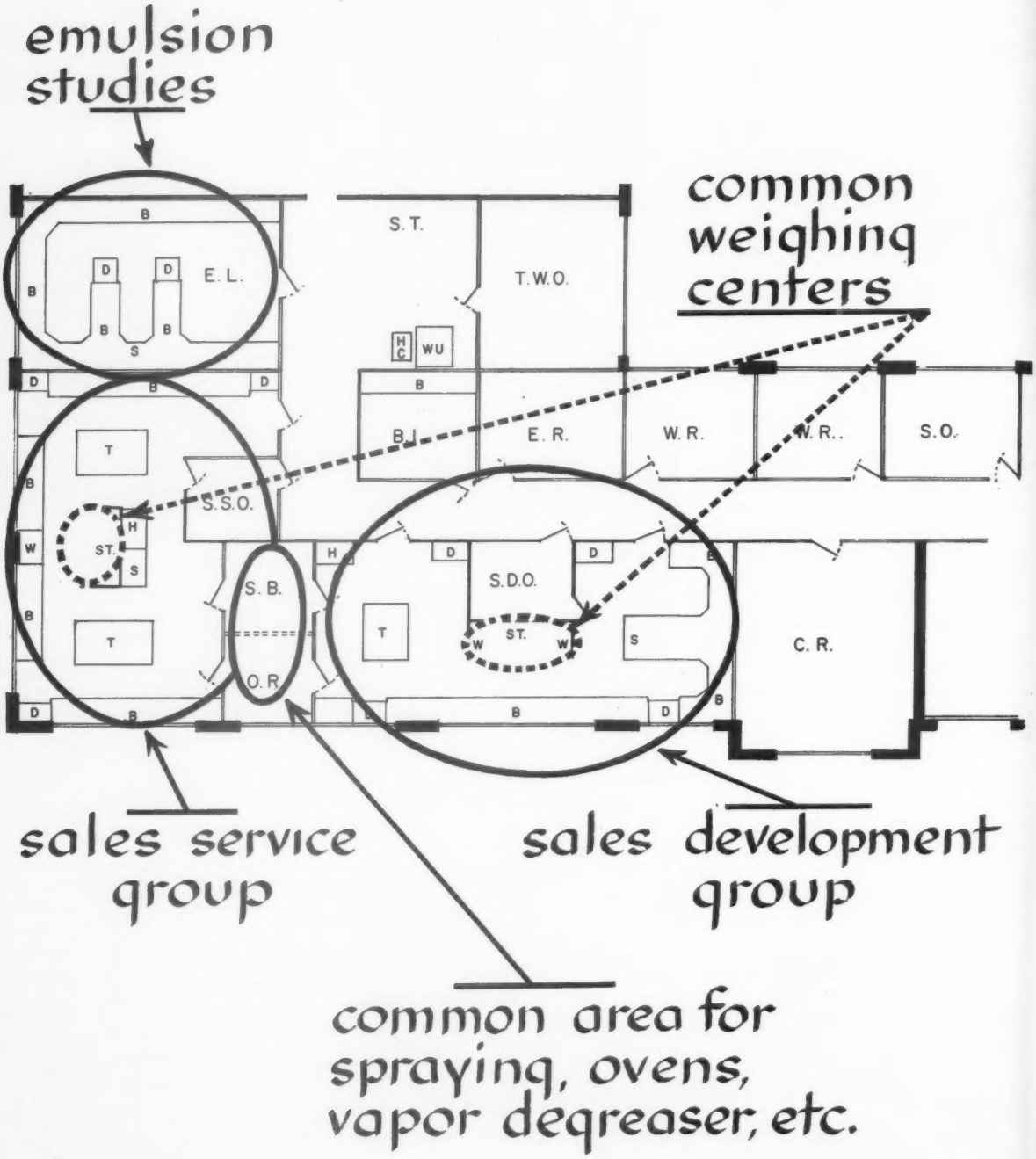
Customer problems are handled in the sales service laboratory. This laboratory was recently concerned with the development of a special coating for bowling pins having a high degree of toughness and impact resistance. After considerable amount of formulation, reformulation and testing, a satisfactory coating based on half-second butyrate resulted. Applied by a special dipping process, this formulation showed remarkable performance when field tested, and is currently being adopted by bowling pin manufacturers throughout the country.

The sales development laboratory handles projects of a very specific nature. Some research work is also carried out in this laboratory. This work may involve



Viscosity measurement being made with Hoeppler viscosimeter in a constant temperature bath.

ZONE PLAN



CODE ON LAB LAYOUT

B - laboratory bench
BL - bacteriological lab
CR - conference room
D - desk
EL - emulsion laboratory
ER - electrical panel room
H - hood
HC - humidity cabinet
OR - oven room
S - sink
ST - storage
SB - spray booth
SO - main coating office
SDO - sales development office
SSO - sales service office
T - table
TWO - technical writer's office
W - weighing center
WR - wash room
WU - weathering unit



Spray booth with replaceable paper filters (right). These filters eliminate the need for water wash systems.



Coating for bowling pins being examined after field testing in bowling alley.

compatibility studies or screening polymers for possible application in coating formulation.

For example, this laboratory undertook a fourteen month study involving the evaluation of a variety of sucrose derivatives to ascertain their possible use in coatings. From this program sucrose acetate isobutyrate (SAIB) was discovered because it showed promise in lacquers, hot melts, and protective coatings by offering formulators several advantages such as increased nonvolatile content at application consistency; high modification of film former without loss of film hardness; improved adhesion to paper, cloth, plastics and aluminum; low volatility and low color at temperatures to 340° F; freedom of color, nontoxic; nondiscoloring to ultraviolet radiation; unaffected by contact with bronze powders; good solubility and compatibility with polymers and modifiers.

One important function of these laboratories is to train newly-hired salesmen in the various phases of coating technology, particularly formulation, testing and application methods. These new salesmen spend three months at these laboratories where they attend lectures, perform laboratory work, solve customer problems, write reports, etc.

Out of these laboratories not only come the answers and solutions to customer problems, but a valuable compilation of scientific knowledge which is the backbone of Eastman's technical service today.



Developing and evaluating emulsions for various commercial applications.

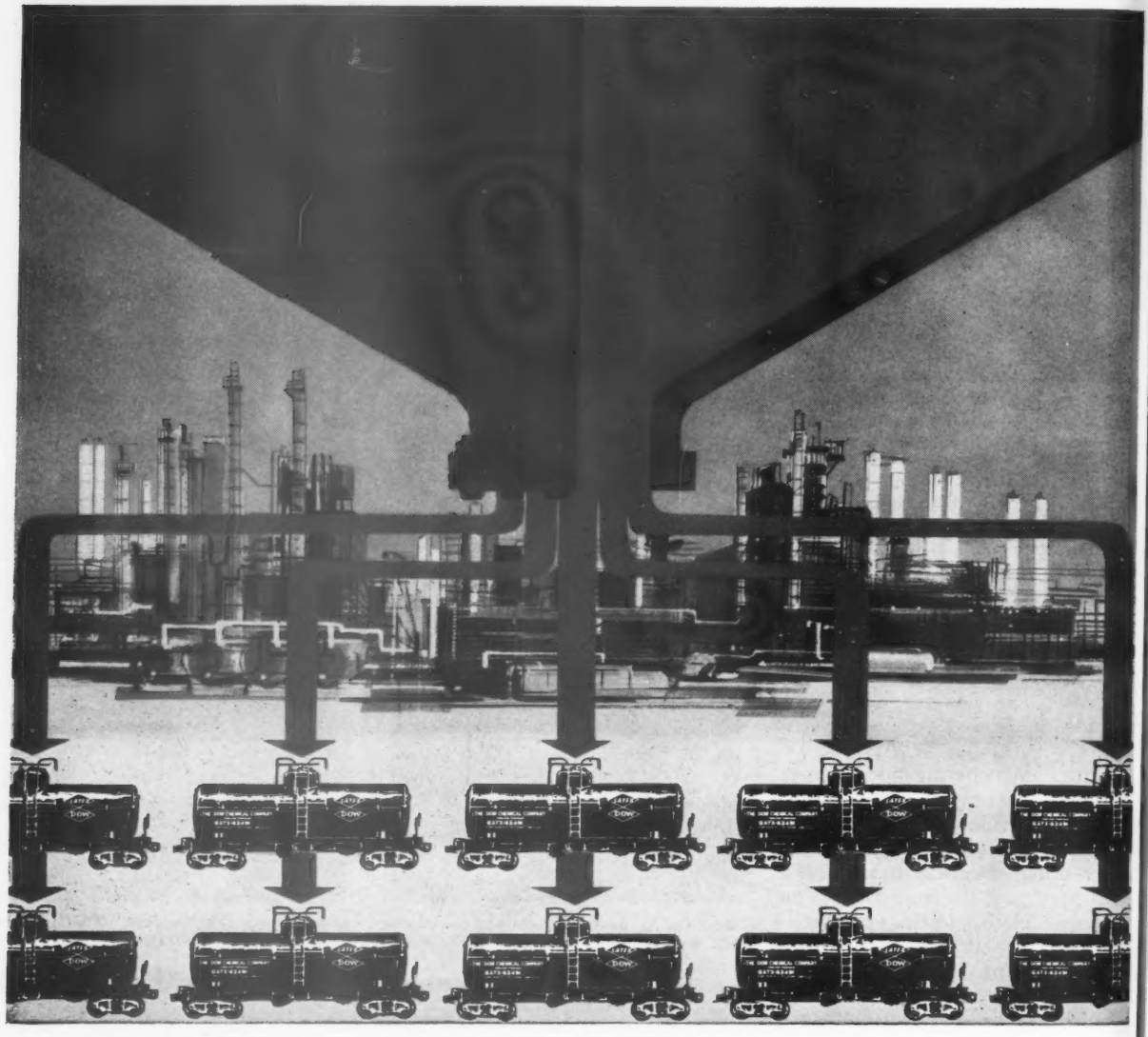


Performing folding test. Test determines film flexibility and toughness.



L to R: C. H. Penning, Mgr. of Market Survey of Eastman's Chemical Div., C. Coney of Sales Development Laboratory, and F. Ball, Senior Chemist in Charge of Protective Coatings discuss the potential of a new lacquer for wood finishing.

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You can always be sure shipments of Dow Styrene Butadiene Latex will be as uniform as modern manufacturing ingenuity can make them. The secret? *Volume blending!* All paint latexes are manufactured in batches. Regardless of the closest manufacturing specifications, each batch will have its own identity and if it were shipped, this difference might be detected in your formulation. To avoid this, Dow's production runs of latex are continuously being added to storage tanks holding previous batches of latex. In the case of latexes with greater demand, these tanks hold up to 400,000 gallons of latex representing over 100 separate batches. This assures uniformity of all orders filled from these tanks.

The savings are important, too. Dow Styrene Butadiene costs less per gallon of paint than other so-called "comparable" latexes. Costs less to formulate because it's readily compatible with a wider range of modifiers. It can be the base for an entire line for brush, roller, or spray gun application on concrete floors, exterior masonry, interior walls, roofs and lawns. *What's more,* this combination of careful quality control, uniformity, and continuing research delivers such *plus* benefits as resistance to water spotting . . . ready acceptance of even the most difficult organic colors . . . superior pigment binding resulting also in higher critical PVC. Your Dow sales office has the complete profit-making story. Or write to THE DOW CHEMICAL COMPANY, Midland, Michigan, Coatings Sales Dept. 2319DL1.

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By
Phil Heiberger

The author continues his random reflections on various aspects of the paint industry. The opinions expressed in this column are his alone and do not necessarily reflect those of this publication.

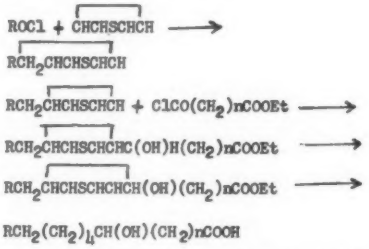
A New Fatty Acid Synthesis

FEW naturally occurring fatty acids contain hydroxyl groups. The only commercially available one known to me is ricinoleic acid derived from castor oil. It is possibly to synthesize hydroxy acids. Such preparations are usually carried out by one of two methods: hydrolysis of halogenated acids or reduction of keto acids. These intermediates are relatively rare and, therefore, expensive.


P. Heiberger

Recently K. E. Miller, C. Haymaker, and H. Gilman ["Studies in the Synthesis of Long-Chained Hydroxy Acids," *Journal of Organic Chemistry*, *24*, 622 (1959)] undertook a program of synthesizing hydroxy acids by the Raney nickel catalyzed reduction and desulfurization of related thiophene derivatives.

Essentially, the authors used thiophene, CHCHSCHCH, as a chain extender, the sulfur ultimately removed by desulfurization. Other workers used this process to prepare long chain mono- and dicarboxylic acids, ketones, alcohols, and hydrocarbons. Figure 1 gives the reaction sequence.



The process may not be economical enough for synthesizing film formers, but it may now be possible to study unusual series of long chain modifiers, many of which may possess novel properties valuable for use in additives.

The authors describe the preparation of 6-hydroxyhexacosanoic, 4-hydroxy tetracosanoic, 10-hydroxy dotriacontanoic, and 10-hydroxyhexacosanoic acids.

Tall Oil Story

Speaking of rare fatty acids, B. L. Hampton and D. Leavens, in a communication to the editor (*Journal of Organic Chemistry*, *24*, 1174 [1959]), reported that they found about 1.4-1.7% unsaturated C20 acids in crude tall oil.

Peddlers

Some of the crack salesmen in our industry tend to refer to themselves as "peddlers." Although this designation is usually uttered in a tone of good-natured banter, I have often sensed a trace of ruefulness not easily ignored.

Many of these "peddlers" are extremely well qualified technically, and they perform and are accepted by their client-customers more as consultants than as salesmen. In their capacity as consultants, they render a key service to the industry.

I write this brief testimonial because I respect trained, competent technical salesmen and flinch inwardly at sight of their self-disparagement.

Just for the fun of it, I went to the trouble of looking up the word "peddle" in *Webster's New World Dictionary*, and found the following definitions: *v.i.* 1. To go from place to place selling small articles. 2. To spend time on trifles; piddle; dally. *v.t.* 1. To carry from place to place and offer for sale. 2. To deal in or dispense, especially in small amounts, as narcotics, gossip, etc. I concluded that the terms "technical salesman" and "peddler" are neither equivalent nor interchangeable and should not be used as such.

Multiplicity of Complications

In introducing their paper, "Linear Phenol Formaldehyde Polymers: Synthesis of ortho-para Linked Polymers," in the *Journal of Polymer Science 38*, 513 (1959), authors W. J. Burke, S. H. Ruetman, and H. P. Higginbottom state the following:

"The chemistry involved in the preparation of phenol formaldehyde polymers is much more complex than that encountered in the synthesis of other important types of condensation polymers, such as the polyamides or the polyesters. This is in part a result of the large number of isomers possible with relatively low molecular weight condensates. For example, there are 13,203 linear isomeric structures for a polymer having only ten phenolic units tied together with

methylene bridges through ortho or para positions. The situation is further complicated by the fact that even the low molecular weight intermediates are not well characterized and the final highly cross-linked structures used commercially are not amenable to most of the more useful methods for characterizing polymers."

Language Frequency Count

In "Fifty Foreign Languages at Chemical Abstracts," *Journal of Chemical Education, 36,* 478 (1959), Karl F. Heumann and Peter M. Bernays report on how *Chemical Abstracts* handles foreign language papers. Of specific interest to many is the frequency count of language usage in *Chemical Abstracts*. It may be a good indicator of chemical activity in the various countries of the world.

The chart below may prove helpful to those of us who are occasionally called upon to advise youngsters regarding their choice of a language for study in high school or college.

Language	Frequency
English	50.5%
Russian	16.8%
German	9.7 %
Japanese	6.1 %
French	5.5 %
Italian	3.6 %
Bohemian	1.6 %
Polish	1.5 %
Spanish	1.0 %
Romanian	0.8 %
Others	2.9 %

The above figures are based on a 10% sampling of the 1958 *Chemical Abstracts*.

Inorganic Polymers

Some people think we have gone a long way in synthesizing organic vehicles and the pigments and inorganic polymers will provide more fertile fields for future studies.

A group at the University of Illinois seems to be of this mind and is giving the matter some attention. In the paper "Copper Phthalocyanine Polymers" (*Journal of the American Chemical Society, 81,* 4395 [1959]), the authors, W. C. Drinkard and J. C. Bailar, Jr., begin by stating, "The high thermal stability of copper phthalocyanine makes it an interesting unit for the formation of polymers. The investigation reported. . .involves the formation of polymers by substitution of pyromellitic dianhydride for phthalic anhydride in the conventional phthalocyanine synthesis. The size of the polymer. . . has been investigated and the effect of reaction conditions on polymer growth has been studied."

Polymeric copper phthalocyanine has been produced by reaction of pyromellitic dianhydride, copper (II) chloride, urea and catalyst at 180°C. Average molecular weights as high as 4,000 have been observed. Although the development of color has not been the object of these experiments, the authors state "all the polymers investigated are olive green in color. There is, however, a definite relationship between shade and molecular weight. Low molecular weight materials are light green while larger polymers appear almost black in the solid state." Attempts to produce higher molecular weights were unsuccessful.

Future developments should be watched carefully. Surprises may well be in store.

Oceanography

Allowing imaginations to soar, oceanographers have been dreaming up a number of grandiose projects. Among those proposed are undersea laboratories, mining on the ocean floor, pipelines between continents, deep-sea vehicles, new transportation concepts, deep-sea mineral exploration, and wresting food from the sea.

Contemplation of these projects provides food for at least two dizzying thoughts: 1. The astronomical expenditures likely to be involved. 2. The fantastically complex paint problems likely to arise.

Semantics and Spending

Frank D. Thompson, publisher of *Industrial Laboratories*, explains in the magazine's its name to RESEARCH/DEVELOPMENT effective with the January 1960 issue. It's all because of a "subtle semantic shift—typical of a growth situation—(which) took place in the language of our times" in the 10 years since the publication was launched. The newsmagazine's original policy of promoting "intellectual cross-fertilization in the specialized disciplines that apply scientific knowledge to industrial objectives" remains unchanged.

Curiously, the decade's semantic shift paralleled a spending pattern shift. In 1950, national spending for research and development was less than $3 billion. This amount had increased to $10 billion by 1958 and an anticipated $12-14 billion for 1959.

Of course, one's first reaction is to point out that a good deal of this rise is due to inflation and a spurt in government spending for atomic energy, missile, and space projects. But that does not account for all of it.

Surely, a clearer concept of organized scientific effort in industry explains the enlarged budgetary allocations. A generalized and perhaps somewhat vague concept of the industrial laboratory was gradually replaced by a more specific concept of the activities taking place in that laboratory. As a finer understanding and a greater appreciation of these activities developed in the mind of management, a greater willingness to support them was engendered.

It is now plainly recognized and accepted that all phases of industrial growth stem, in the final analysis, from research and development activities. This is as true in the paint industry as in any other.

•

Warren Elected President Of Paint Research Assoc.

At the annual meeting of the directors of Paint Research Associates, Inc., held in Atlantic City October 18-19, Joe M. Warren of Nashville, Tennessee was elected president of this research group, succeeding W. H. Sweney, Jr., of St. Paul, Minnesota, who was named vice-president. Also elected were Richard S. Bennett, Salt Lake City, Utah, treasurer and Loren B. Odell, Houston, Texas, secretary.

Founded in 1943, Paint Research Associates engages in basic research and development in paints and allied products for the benefit of thirteen member companies, all regional paint manufacturers. Central laboratory facilities are maintained in Chicago, under the supervision of William T. Walton, Director of Research.

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The results are measurable in dollars and quality:

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You can use this system for practically any paint you make: all conventional formulations of flat, semi-gloss and gloss finishes . . . pure oil-type house paints, shake and shingle paint, sash and trim paint . . . as well as standard formulations of PVA, acrylic and alkyd modified styrene butadiene emulsions.

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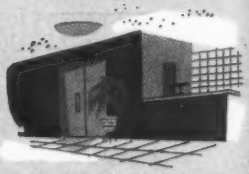
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Drais-Lehmann Planetary Mixer, showing stirrer unit in raised position

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The Mixer functions on the planetary principle with two agitators turning along the tank wall and simultaneously rotating at a higher speed around their own axes. The stirring mechanism has mixing blades of opposed, staggered spiral arrangement (see photograph); a rod type stirrer or a special agitator—according to the material processed. The machine is available in several types, power specifications and metals, including stainless steel.

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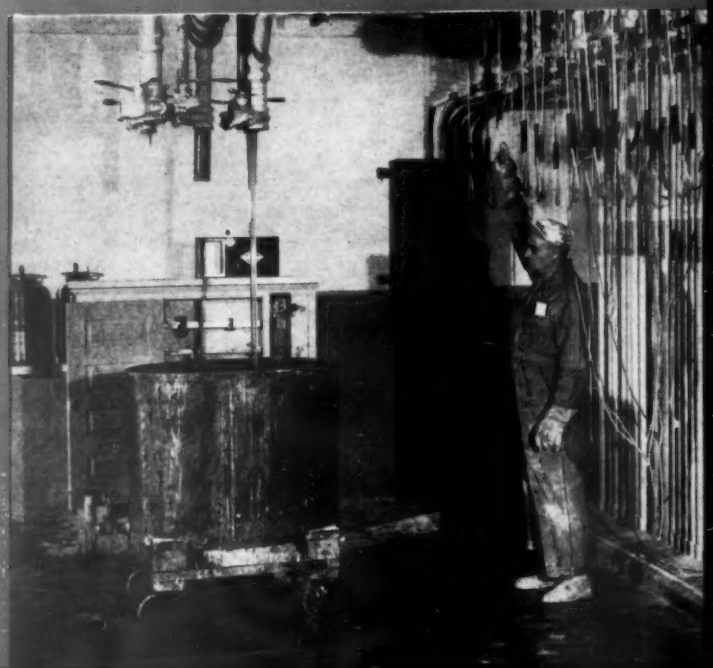
PRODUCTION

PACKAGING

MATERIAL HANDLING

NEW EQUIPMENT and MATERIALS

Production forms provide necessary information and details for making up a batch of paint. In this month's production feature (page 61) Lawrence Shatkin discusses eight forms which production managers find useful.



STEEL PAILS-DRUMS

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TOP QUALITY - FAST DELIVERY

Every practical size and style . . . Open-Head, Closed-Head, . . . all popular pouring and filling openings . . . colorfully Lithographed or any solid color . . . Pail sizes 1 through 13 gallons . . . Drum sizes 13 through 65 gallons.

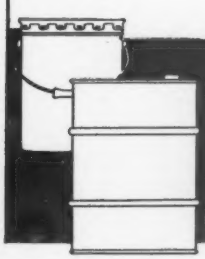
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PRODUCTION FORMS

By
Lawrence Shatkin

MY last article dealt with a "Forms Control Program." (See December 1959 issue, pages 61-62.) As an extension of this subject, I describe in this article several forms found useful to a production manager in the course of his work. The number of these forms should be kept to a minimum. Lack of control of these forms suggests haphazard gathering of data which are required by top management to meet primary and collateral objectives of the organization.

Manufacturing Forms

Figure 1 represents a manufacturing ticket in triplicate. This form is initiated when an order is received for which there is insufficient stock, or the item is a "special", which is not ordinarily stored. The original (white) copy flows from the shipping department to production (together with formula), to the laboratory where it is ultimately signed and passed on to the filling department. It is finally returned to the office where production figures are collected and recorded.

During the interim, the second (pink) copy is routed to the labeling clerk so he can anticipate the label requirements for the particular order. This copy is discarded after the order is filled.

The third (yellow) form is retained by the shipping department and discarded periodically.

ITEM_____

FOR_____ № 13587

SPEC. INSTR._____ STENCIL _____

DATE

	DRUM	5	2	1	1/4	1/8	1/16	1/32	1/64	TOTAL
NEED										

LABELING TICKET Size of Batch_____ gals.
(BEFORE ANY DUMPING)

ITEM_____

FOR_____ № 13587

SPEC. INSTR._____ STENCIL _____

DATE

	DRUM	5	2	1	1/4	1/8	1/16	1/32	1/64	TOTAL
NEED										
PROD.										

FILLED BY_____

DATE FILLED_____

SAMPLE TO LAB	
1/16	1/32

OK'd by_____
P738A

ITEM_____

FOR_____ № 13587

SPEC. INSTR._____ STENCIL _____

DATE

	DRUM	5	2	1	1/4	1/8	1/16	1/32	1/64	TOTAL
NEED										

SHIPPING ROOM COPY

Figure 1. Manufacturing Ticket.

The opinions expressed in this feature are not necessarily those of any particular firm or organization.

Figure 2 shows a production formula design. It is important that it be as simple as possible, and yet retain the necessary information.

Before this form is sent to the factory, certain data are entered. In the first place, the ingredients are written in ink, either in pounds or gallons, together with the size of the batch and tank number, stencil or identification code, and customer's name when required. In addition, certain physical constants such as KU, weight per gallon, baking specifications, dry requirements, etc., are recorded on the back side of this form.

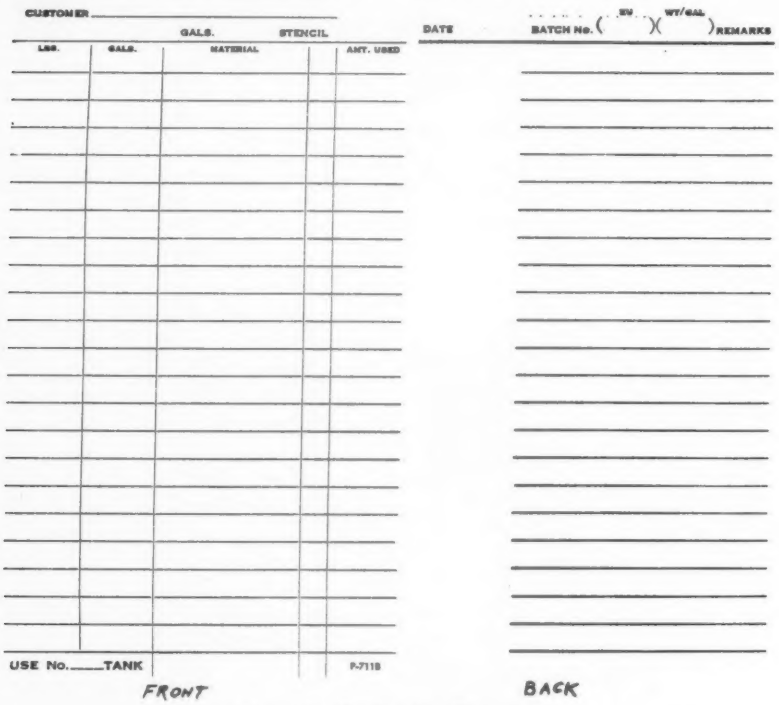


Figure 2. Production Formula

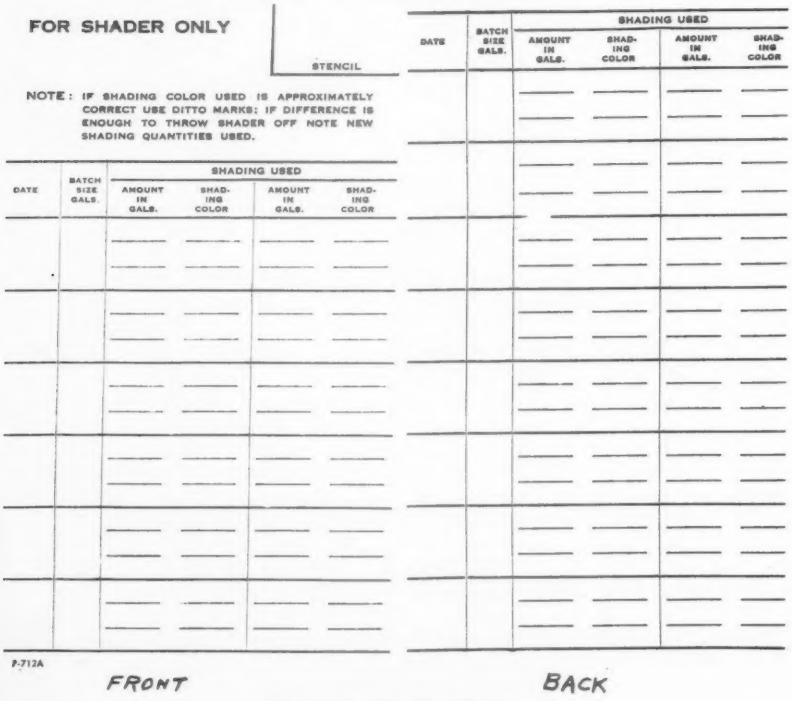


Figure 3. Shading Form

The worker checks off in pencil each item in the column marked "Amt. Used" as it is added to the particular vessel. These checks are easily erased, so that the form can be reused approximately eight times. It is advisable to insert this form into a formula holder as it is routed in the plant in order to prevent it from being soiled. In the event any shading bases are required, a special form is stapled to the back of the formula. This design is depicted in figure 3.

The value of the shading form is that it serves as a starting point for whoever might be called upon to shade in the event of an emergency. The shading colors and quantities used can be reviewed by the laboratory at any time, without relying on speculation. It reduces the time spent on shading because the recorded information is a guide that will bring the shader approximately 75 to 85% to standard at the outset.

Figure 4 is a form widely used whenever any modification has to be made to the formula. The batch number is recorded in order to identify the material in the plant. The names indicate the area to which this form is forwarded.

The plant is directed to make an addition, reshade, or guage the tank capacity. The control chemist will readily see what has to be done when the sample is returned to the laboratory. If necessary, further checks can be made by sending additional forms to the plant. The boxes numbered two to five indicate the frequency of sampling. When the batch is passed, the information from the adjustment form is transcribed to the production formula, and then discarded.

Figure 5 is a daily production form used by the filling department. It is returned to the production manager for his perusal and filing. It denotes down-time, which is a focal point in any production analysis. The aim is to keep this down-time to a minimum through new methods, systems, techniques, increased morale, or any other innovation.

Payroll

Figure 6 is a simple, mimeographed form used for temporary job transfers. It is needed by the office when figuring the payroll.

BATCH

Lou D .....
Pete .....
Al Y .....

After adding, check below

ADD:

.....gals. Varnolene _____
.....gals. 21 BA _____
.....gals. Solution _____
.....gals. Sil _____
.....gals. APCO #18 _____
.....gals. _____

☐ Gauge .....Gals. ☐ Reshade
☐ 1/8 cup to lab.
☐ Paper cup to lab.

2 ☐ 3 ☐ 4 ☐ 5 ☐

LAB. CONTROL:
☐ KU
☐ wt/gal
☐ brushout
☐ color chip
☐

.....
SIGNED

L to P
A-713 8

Figure 4. Batch Adjustment Form

Inventory

Figure 7 shows a raw material inventory sheet used during various accounting periods. Instructions are printed on the back side of the form.

The design in figure 8 is used by the shipping department when taking inventory of finished goods. The letters F or R indicate whether the items are in forward or reserved areas.

Forms analysis leads to procedure analysis which is one aspect of a work simplification program. This results in the standardization of paperwork between departments to insure the desired accuracy at a minimum cost. Changes should be made whenever necessary in order to fit them into a growing organization.

Daily sign out sheet—Date____

FILL IN START & FINISH TIME	BATCH	FILLER & HELPER	SIZE FILLED	QUANTITY	TOTAL

Figure 5. Daily Production Form

RATE CHANGE NOTICE
FOR TEMPORARY J B GRADE CHANGE

CLOCK #_____ WEEK ENDING_____

EMPLOYEE_____

	From Grade	To Grade	Hours Worked	Rate/Hr Increase	For Office Use
MONDAY					
TUESDAY					
WEDNESDAY					
THURSDAY					
FRIDAY					
SATURDAY					
TOTALS					

FOREMAN

(a) Submit this notice. If 8 actual working hours per week or more on higher job grade.

(b) Higher rate will be paid for full week, if 20 actual working hours or more on higher job-grade.

Figure 6. Temporary Job Classification Form

RAW MATERIAL INVENTORY

ITEM	Full or Part Full Drums or Bags			Do Not Write In This Space		
	Quantity	Net lbs. Each	Net Gals. Each	Total Lbs.	Total Gals.	Unit Cost

Figure 7. Raw Material Inventory Form

SECTION	F or R	ITEM	5 GAL.	2 GAL.	1 GAL.	¼ GAL.	⅛ GAL.	1/16 GAL.	1/32 GAL.	1/64 GAL.	TUBES

Figure 8. Finished Goods Inventory Form

Safe Material Handling Provided By Elevating Truck

HAZARDOUS environments, such as may be found in paint, petroleum, and many industrial plants, generally restrict material handling to either hand or conveyor operations. The more maneuverable types of material handling equipment—electric or gas power mobile trucks—are obviously unsuitable. This was the problem facing the Columbus Coated Fabrics Corp., Columbus, Ohio.

The storage room for open-top, 55-gallon drums of volatile paint (actually printing inks for coating fabrics) was a bottleneck to the operation. Drums were handled with a portable crane that was slow and restricted storage of the drums to a single level.

Material handling engineers at The American Pulley Co., Philadelphia, Pa., recommended a special portable elevating truck with an air-powered lifting mechanism. Whenever lifting or lowering of the heavy drums was required, the elevating truck is "plugged into" the compressed air system.

Batteries, electric motor and controls normally used to supply pressure to the hydraulic pump for the lifting ram of a portable elevating truck, called an Air-Oil Safeway, were replaced with an air motor to drive the pump and a compressed air connection. Hand-operated controls were also designed to regulate raising and lowering of the paint-filled, open-topped drums.

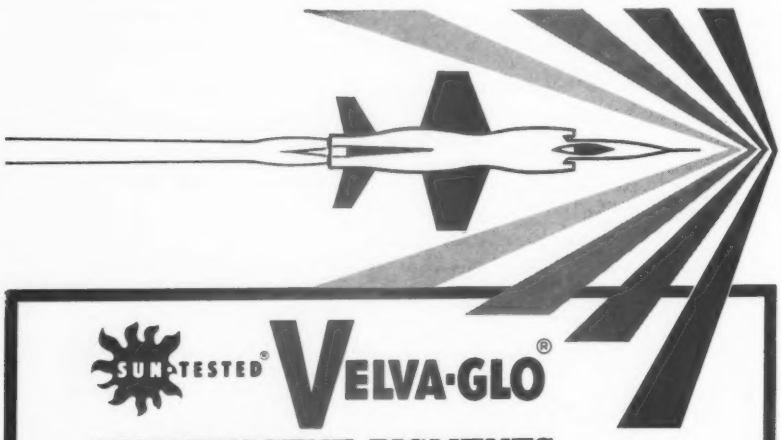
An air line was run around the drum shorage room with push-pull hose connections every ten to twelve feet. Air line pressure as low as 50 psi operates the lifting system through a 15-foot length of flexible hose. When it is desirable to remove a drum from the storage rack, the elevating truck is pushed to the location and plugged into the air line. Standard drum arms clamp the drum and the air-powered unit raises or lowers the full 55-gallon drum in 15 seconds.



Air-powered Safeway raises or lowers a full open-top, 55-gallon drum of paint in 15 seconds.

The Safeway is designed to hold a full drum when the air hose is disconnected. To move a drum along the aisle, the attendant merely disconnects the air hose, pushes the truck to the new location and plugs the air hose back in. Main use of the truck at Columbus Coated Fabrics is to raise or lower the paint-filled drums between the storage racks and four-wheeled dollies used to transfer the drums to the machine area. The air-powered elevating truck handles the drums smoothly without tilting or jerking to reduce splashing and spilling.

The system handles a drum approximately every two minutes—right around the clock. Records show an average of 28 drums per hour checked in and out of storage, with peak loads occurring at changes of shifts. The Safeway handles drums twice as fast as previously; two-high stacking makes more efficient use of storage space; and, the air-oil unit handles drums smoothly and efficiently, despite extremely narrow aisles. Space between the racks is four feet, but the effective aisle is reduced by a ten to eleven inch spigot overhang from drums on both sides of the aisle.



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RADIANT COLOR COMPANY

830 Isabella St., Oakland 7, California

Manufacturers of Velva-Glo fluorescent pigments, paints, papers, cardboards, fabrics. 18



Continental announces a

NEW

unlined Tripletite can with built-in protection for PVA paints.

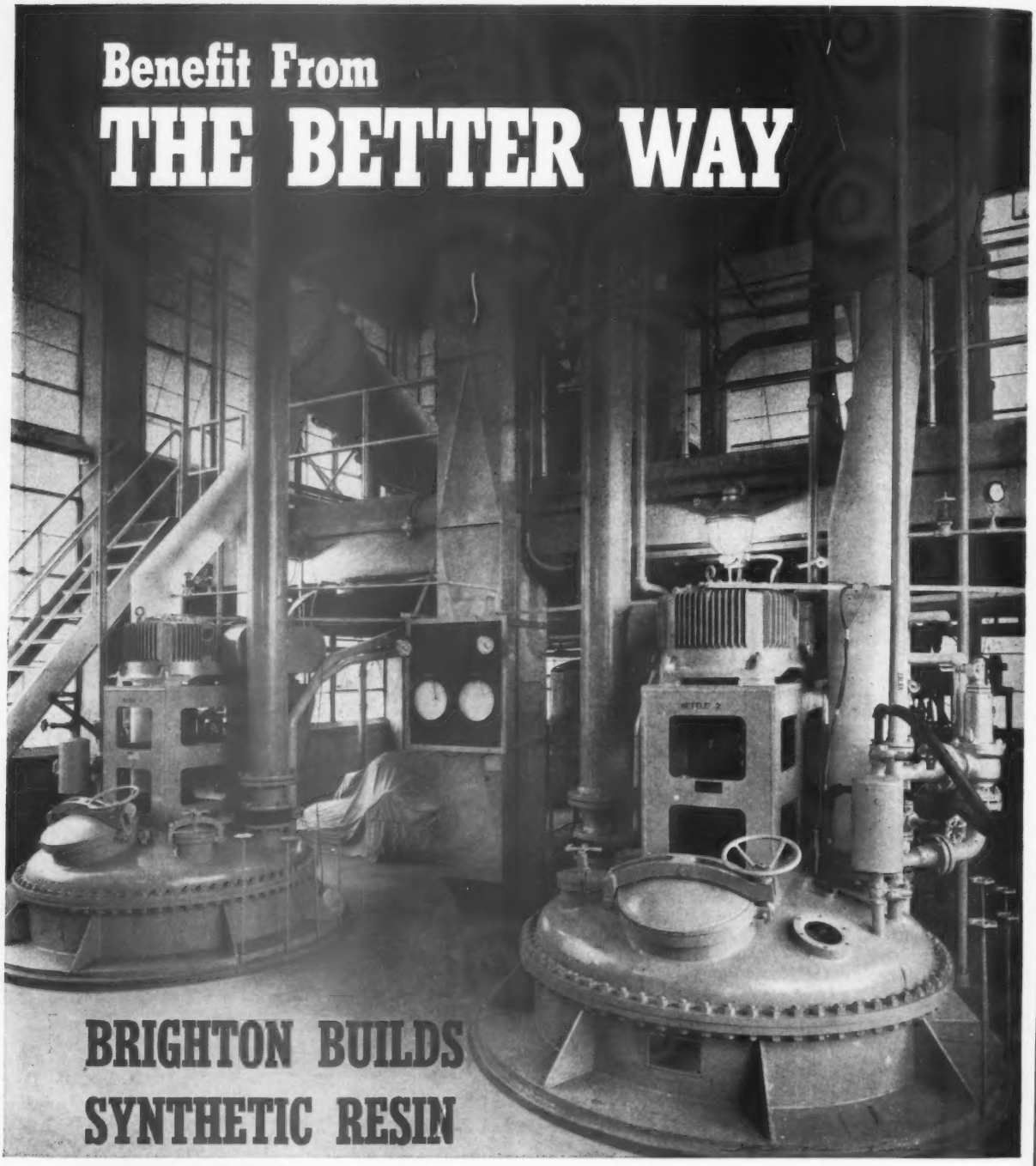
Ask your Continental salesman about this!

Continental new **Tripletite** can for **PVA** paints now gives more **product protection** than any other can.

CONTINENTAL CAN COMPANY

Eastern Division: 100 E. 42nd Street, New York 17
Central Division: 135 So. La Salle St., Chicago 3
Pacific Division: Russ Building, San Francisco 4
Canadian Division: 790 Bay St., Toronto, Ont.
Cuban Office: Apartado #1709, Havana

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THE BETTER WAY



BRIGHTON BUILDS SYNTHETIC RESIN REACTORS . . .

Brighton Reactors speed efficiency, lower processing costs in alkyd type resins. Nearly a half century is reflected in development of Brighton Reactors, so designed to handle a variety of alkyds, yet flexible enough to meet the demands of modern processing. Other basic components available include the condenser, decanter-receiver, thinning tank, heating plant, control board.

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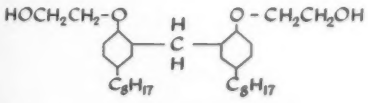
New Developments

AROMATIC DIHYDRIC ALCOHOL EASES PHTHALIC SHORTAGE

In these days of a phthalic anhydride shortage and the necessity of reformulation, Nopco's Droxol-B, an aromatic dihydric primary alchol, is rapidly gaining attention for immediate relief during the current shortage.

Droxol-B has been the subject of extensive evaluation in the alkyd resin industry for the past year. It is a useful tool for the alkyd resin chemist and is especially recommended for the industrial maintenance field where alkali resistance, water resistance and flexibility are prime qualities.

The chemical structure is represented by the following idealized formula:



A fair amount of phthalic anhydride can be displaced by Droxol-B, depending upon the precise properties needed in the final product. Some work has also indicated that some isophthalic alkyds, formulated with Droxol-B, can give close matches with the phthalic anhydride alkyds.

Table I gives typical formulations showing how specific reformulating with phthalic anhydride alkyds can be accomplished.

Typical Physical and Chemical Properties

Appearance	Amber, soft solid
Softening Point, Durran	53°C.
Color, Gardner	4 –8
Specific Gravity at 25°C.	0.990
Volatility	Less than 1.0%
Moisture Content	Less than 0.3%
Average Molecular Weight	528
Equivalent Weight	264
Hydroxyl Number	212-215

This article was prepared by L. D. Grupelli and E. H. Herron, Jr., Nopco Chemical Co., Newark 1, N. J.

COMPOSITION

OIL LENGTH	PHTHALIC	DRONOL-B	PENTA	METHOD	FATTY TYPE
50	23.0	10.5	16.5	Single	DCO FA
46.8	23.3	14.2	15.7	Single	DCO FA
35.6	24.9	26.6	12.9	Single	DCO FA

VEHICLE PROPERTIES

SOLID CONTENTS	SOLVENT	VISCOSITY	ACID VALUE
50%	V. M. & P	X	10.0
50%	V. M. & P	Z	10.5
50%	Mineral Spirits	Y	16.7

Table I

Continental Develops Rust-Free Paint Can

Continental Can Co. has announced the development of a PVA paint can which eliminates interior lacquer. The new can, according to tests, will be as rust free when filled as any inside lacquered container now being manufactured.

The principle of the new container is based upon material used in the manufacture of the container which acts as a "scavenger" and absorbs oxygen which may be present in a paint-filled can. Continental already has successfully tested PVA paint formulas known to be extremely corrosive and difficult to hold in a metal container. With this most recent development added to the paint packaging protection available with the company's exclusive "outward curl" feature on its Tripletite cans, the company believes it now has a container superior to any available for packaging PVA paint.

The outward curl can, made in quart and gallon sizes, aids in corrosion prevention by eliminating the raw metal edge of the friction ring by turning it outside the can where paint can't touch it. PVA and latex base paints have longer shelf life with this feature. The new paint can with the "scavenger" action again increases the shelf life of PVA paint by reducing the amount of oxygen in the can.

New Latex Developed

Development of a new latex with low foaming advantages for use in metal primers has been announced by the Plastics Division of Koppers Company, Inc., Pittsburgh, Pa.

This new latex for non-flammable primer coatings is particularly suitable for the automobile industry, since the current trend in automobile design is toward unitized bodies. It is useful, as well, in primer coatings for steel drums, machinery, and metal furniture.

Known as "Dylex KCD-141," this new product has undergone extensive tests which resulted in an industrial primer that has less foaming, improved corrosion resistance, and impact resistance. Metal pieces painted with a primer coating containing this latex were specially tested under severe salt spray conditions and showed excellent corrosion resistance.

New Sorptometer Simplifies Measurement

Simple and accurate studies of surface area and other adsorption phenomena have been made possible by the introduction of a unique new type of sorptometer by the Perkin-Elmer Corp., Norwalk, Conn. Manufactured under exclusive license from Shell Development Co., Emeryville, Cal., the Model 212 Perkin-Elmer-Shell Sorptometer will find application in any field where examination of the physical properties of solids is required.

In operation the Model 212 passes a known helium-nitrogen mixture through a sample cooled by liquid nitrogen. The change in the mixture's nitrogen concentration is measured by a thermal conductivity detector and inscribed as a peak on a potentiometer recorder chart. A second peak is then obtained by warming the sample and measuring the amount of nitrogen released. The two peaks' areas are proportional to nitrogen adsorbed and desorbed. A simple calculation then affords the required data.

Applications of the Model 212 will cover a broad range of quality control and development areas. Shell Development Co. designed the instrument to meet its specific needs in connection with its studies of catalysts. Refineries will also find the new Sorptometer of considerable value in routine analyses of uniform samples such as silica-alumina cracking catalysts.

In other industries it will be useful in chemisorption studies—for example, hydrogen on platinum. The Model 212 will also be employed in the examination of such materials as cosmetics, pigments, clays and ceramics, soils, powdered metals, fertilizers and abrasives.

This new instrument offers four important advantages over previous techniques: it is extremely fast, accomplishing a one-point comparison with a known standard in as little as 10 minutes; fragile and complicated glassware has been eliminated along with the need for vacuum equipment; unskilled personnel can operate the unit; and it automatically affords a permanent record of its analysis.

The Perkin-Elmer-Shell Sorptometer is of clean, compact design with dimensions of 33″ high by 22″ wide (add 8″ to include Dewar flasks) by 15″ deep. The cabinet enclosure provides space for an L&N Model G recorder of 1 or 5 mv nominal span. The Model 212 can be supplied with or without the recorder.



Examinations of surface areas and other adsorption phenomena can be obtained simply and accurately with the unique new sorptometer.

Du Pont Announces New "Dry" Phosphatizing Process for Metals

A new "dry" phosphatizing process, which eliminates water solutions and applies protective phosphate coatings to metal parts at savings in equipment investment, floor space and operating costs, was exhibited at the recent National Metal Exposition and Congress, Nov. 2 to 6, by the Du Pont Electrochemicals Dept.

The phosphatizing process, linking vapor degreasing to spray-in-vapor painting in a complete metal finishing system based on "Triclene" trichlorethylene, was shown operating in a plant-scale unit at the company exhibit. This compact machine was designed and fabricated by G. S. Blakeslee & Company, Chicago, which is cooperating in the development.

In the new process, metal parts are given a phosphate coating by dipping or spraying with a trichlorethylene-based phosphatizing solution maintained at its boiling point (188 degrees F.). After phosphatizing, as the parts emerge from the trichlorethylene vapor zone, the solvent completely evaporates leaving parts dry and ready.

The coating, as formed on steel, is a strongly adherent form of iron phosphate which provides an excellent paint base. Coating weights from 40 mg./sq. ft. to over 200 mg./sq. ft. can be achieved in from one-half to three minutes' time.

This new process, which will be commercially available in mid-1960, is now operating on a field trial basis at several locations.

This new painting system slashes costs because thinner and paint overspray are recovered and reused in the machine. And—most important—the use of trichlorethylene, a chlorinated hydrocarbon solvent, minimizes fire hazards and reduces the investment required for fire protection equipment.

These three basic trichlorethylene processes, it was pointed out, provide metal finishers with a highly flexible tool that can be adapted to specific needs. All three processes can be used together in a compact metal finishing system, used in various combinations, or incorporated separately into existing finishing systems.

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- **Controlled Evaporation.** Soltrol 130 provides conventional drying characteristics. Soltrol 170 maintains a longer wet edge. You can combine the two to get the exact drying time you require. Compartmented cars containing both Soltrols are available.
- **Dependable.** Prompt, on-time deliveries assured by modern efficient production facilities.
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CLEAN UP
PAINT UP
FIX UP

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acicular ZINC OXIDE gives paint Extra durability

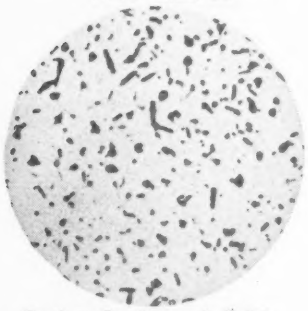
Forty years ago, American Zinc produced the original acicular lead-free zinc oxide that received wide acceptance by the paint industry and led the way over the years to improved durability from zinc oxide in exterior paints. AZO acicular zinc oxides are available over a wide range of oil absorptions to give you the required paint consistency.



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AZO ZZZ-22



For Medium Consistency in Paints
AZO ZZZ-11



For Low Consistency in Paints
AZO ZZZ-33

AZO acicular zinc oxides are free from detrimental colloidal fines, produce exceptional weathering properties in exterior paints, and are resistant to hard settling during shelf storage. For general use in the production of paints and enamels.

ALL AZO PAINT GRADE ZINC OXIDES AVAILABLE AS AZODOX (De-Aerated)

AZODOX has twice the apparent density, half the dry bulk. Faster handling, easier storing, quicker mixing.

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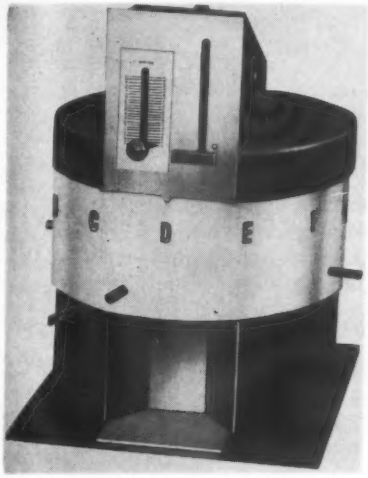
American Zinc was the first, *and is still the only* producer of acicular lead-free zinc oxides covering a wide range of oil absorptions from high to low *and including the intermediate ranges.*

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NEW EQUIPMENT AND MATERIALS

This section is intended to keep our readers informed of new materials and equipment. While every effort is made to include only reputable products, their presence here does not constitute an official endorsement.



SEPE

COLORANT DISPENSER

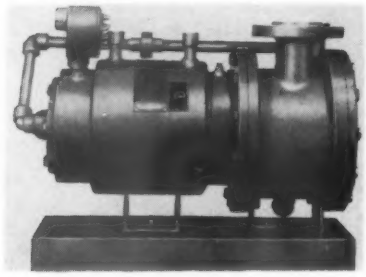
Twelve Canisters

New, low cost, completely manual, bench model colorant dispenser has been introduced. New machine now makes it possible for any size paint or hardware store to have modern, up-to-date colorant facilities. The compact bench model "Matchmaker"—it takes only 24x 24 inches of space—has the same accuracy, superb engineering and dependability as the larger unit. Its 12 canisters with 1½ quart capacity provide unlimited color combinations for all types of paint. It weighs approximately 115 pounds.

The unit is easy to use. Simply select required increment, raise plunger and depress plunger. Sturdy steel construction with a minimum of moving parts assures long life with little or no maintenance. The unit is guaranteed for one year. The Model 400 is available in any increments for any color systems. Sales aids available include a master color counter book with over 1,000 colors.

Since color is a big factor in paint sales, the units with an almost unlimited selection of colors, provide an opportunity for increased sales volume. Yet they require only a fraction of the inventory and investment needed for tube systems. And there is never an problem of obsolescent colors.

Sepe Bros., 408 S. Varney St., Burbank, Cal.



FOSTORIA

PUMPS

Leakproof pumping

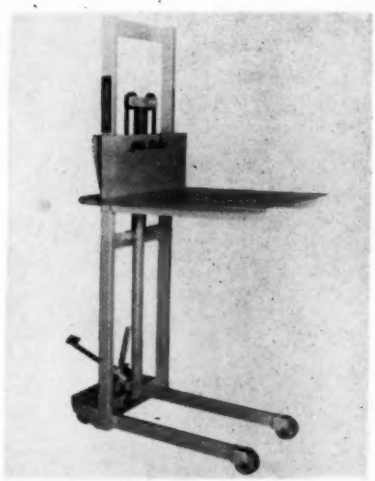
A new series of two-stage, high-head "canned" pumps has just been introduced. The new product line, known as Series D, is designed for leakproof pumping at heads up to 600 feet. All of the advantages of canned pumps are retained. Rotor, shaft and impellers form a single rotating assembly. Both rotor and stator are completely enclosed or "canned" within corrosion-resistant, non-magnetic alloy cylinders. The pumped fluid is allowed to circulate through the motor section and serves to cool the motor and lubricate the bearings. No external lubrication is ever required. Since pump and motor are built as a single unit, there are no troublesome stuffing boxes or mechanical seals. Leakage is completely eliminated. Thus, operating costs are greatly reduced. Low temperature Series D pumps for operation under 400°F. are equipped with water jackets around the stator for cooling if required. High temperature models for the handling of fluids over 400°F. are equipped with external heat exchangers. Series D pumps are available for temperatures up to 850°F. and system pressures up to 3500 psi. The new pumps can be modified for vacuum or slurry service.

Chempump Div., Dept. PVP, Fostoria Corp., P. O. Box 35-1, Huntingdon Valley, Pa.

HYDRAULIC LIFTER

One-Man Use

Featuring foot operation, new hydraulic lifter, the Model FPD Little Dickie needs minimum foot



LANGLEY

effort for lifting loads up to 750 pounds (1,000 pound test). Lifting to a height of 64" above floor level, the unit frees high-rate power equipment for bulk handling operations.

Because of the hydraulic system, the unit is safe in operation, with fluid pressure holding the load, rather than an operator, as in a

mechanical system. No lifting handle or open gears are incorporated into the unit that constitute a danger from clothing catching during operation.

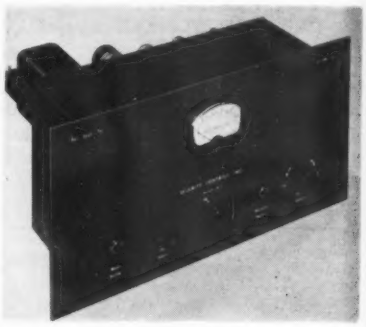
Optional equipment includes a floor lock for applications where conditions require it, floor protective wheels and pipe runners to assist loading onto trucks.

Whether load is raised or lowered, Little Dickie features tight maneuverability, easily controlled by one man. If finds application as a warehouse utility lift and transport truck, in tiering, stacking, breaking down piles and loading. It lowers or lifts from or to dock and street level and makes an ideal stock positioner in cutting, milling, sawing and similar operations. It also serves as a transporter for such items as dies, jigs, molds, castings, index heads and other tools.

Masts and base are high strength-to-weight-ratio steel tubing, with mast and frame arc-welded into a single unit, giving it light weight with a high safety factor. Lifting speed is one inch per stroke under full load conditions.

Weighing only 204 pounds, Model FPD is painted a bright safety yellow for maximum visibility under all lighting conditions. It easily can be lifted onto a truck for transport to and from application areas.

Langley Manufacturing Co., Inc., Dept. PVP, 913 Cambridge St., Cambridge 41, Mass.



SECURITY

SENSING CONTROL
Chassis or Key-locked

Extensively redesigned and broadened in its applications, the new sensing control recognizes metallic and nonmetallic objects, without physical contact, as they enter a capacity field.

Designated as Model 400, it is recommended where switches are impracticable. Consisting of a sensing element or probe (of any form or size) connected by coaxial cable to the electronic control, the device can be set up to any given constant at a given time interval. The control is now available in chassis form for panel mounting (illustrated) or in a key-locked, shock-mounted and gasketed cabinet.

Not only does the unit recognize errors or deviations from the constant, as objects enter the field, but it indicates whether the sensed objects are too large or too small, too far or too near to a predetermined position or setting. Detection is expressed in numerous ways, such as stopping a machine, actuating a rejecting or correcting device (via plus-minus relays) or signaling for action by an attendant, states the manufacturer.

Some example of its uses are: detecting variations in flow of material in chute; revealing changes in moisture content of grain, flour, feed, cereal, gypsum, etc.; indicating changes in liquids flowing through pipeline (i.e. gasoline vs

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kerosene); testing for presence of foreign substances in fluids; discovering undesirable areas in continuous strip material (i.e. ready-made ashesive bandages, gauge products, textiles, sanding belts); signaling improper nesting of blank in press die; revealing broken bits on automatic drilling and tapping machines; counting products in closed cartons; sensing missing caps on filled bottles prior to packaging; controlling position of cans on conveyor prior to filling operations; checking suitability of diesel engine fuel oil to determine necessity of changing; sizing and measuring parts and products on conveyor; actuating solenoids, correcting or rejecting mechanisms, counters, audible or visual signals.

Security Controls, Inc., Dept. PVP, 503 Franklin St., Buffalo 2, N. Y.

FLARING PAIL
29-Gauge Steel

A new, leakproof, 5-gallon flaring pail with a one-piece, one-seam, electrically welded body construction is now available.

The container's single, electrically welded seam provides a positive, leakproof seal making it ideal for packaging liquids such as roofing cement, paint and petroleum products as well as dry and powered products. Its predecessor, the two-piece, lock and cemented two-seam flaring pail was recommended only for dry or powdered products.

Offered in 29-gauge steel throughout (heavier gauges will follow), the new pail's body is first formed and welded into a straight sided shell. The shell is then placed in a machine designed to stretch the metal into the flare. This new method of manufacturing the pails has never been used before in the steel container industry. Sturdy and reusable, the single-seam pail nests snugly to save shipping and storing space.

Beads near the top and bottom give a more rigid and stronger body while a compound lined bottom with a 5 thickness seam adds extra strength to the pail. The inner bottom bead prevents pails from



Write for information today!

McDANEL Industrial CERAMICS

McDANEL
REFRACTORY PORCELAIN COMPANY
BEAVER FALLS · PENNSYLVANIA

sticking too tightly when nested in shipping and storage.

Ears are riveted to the body and doped to prevent leakage. A full skirt and deep gasket groove on the pail cover provide a sure closure and, if desired, permit the use of a gasket. The single-seam pail's body and cover are both receptive to colorful lithography.

Continental Can Co., Dept. PVP, 100 E. 42nd St., New York 17, N. Y.

ANTI-MILDEW POWDER
Non-toxic

New anti-mildex powder is being marketed after three years research to formulate an effective, non-toxic product for preventing mold, mildew and fungus on painted surfaces.

The new anti-mildew compound contains no mercury or other poisonous compounds and can be added to any oil, water and synthetic based paint, flat gloss and enamel finish, varnish and shellac, and used for interior or exterior application. It does not change the color or normal characteristics of the paint and is odorless in paint. Its effectiveness is guaranteed when used and applied according to directions.

The product will be offered to paint manufacturers in 50 pound bags to be mixed with their various products and marketed under their own brand names. Full approval has been provided by the United States Department of Agriculture. Dianol's technical department can handle the registration procedure with the USDA for any manufacturers product, as well as the label approval, at no cost. Individual state registrations can also be taken care of, where required, at no cost other than the small annual registration fee charged by most states.

The new anti-mildew compound adds to a rapidly expanding line which already includes approved paint insecticide and an anti-fouling compound for marine use.

Dianol Div., Mills-Pearson Corp., Dept. PVP, St. Petersburg, Fla.

Solve your problems



before they reach the can

Baker's high-quality additives, THIXCIN® and M-P-A®, are basic insurance for a high-quality paint.

When your paint contains one of these Baker additives, you insure no settling . . . no sagging. You also insure flow control and easy brushing.

THIXCIN® . . . the superior additive for paints processed at moderate temperatures and employing low KB solvents and oil vehicles. M-P-A . . . the non-seeding additive for processing at higher temperatures, effective with all solvents.

These additives were developed solely by Baker. No other additives are backed by the same know-how, experience and service. Ask the paint man who uses them.

6644

THE Baker ESTABLISHED 1857 CASTOR OIL COMPANY
Bayonne, New Jersey

FILLING MACHINES
Packing and bottling

New filling units satisfy basic requirements now demanded of automatic packaging and bottling line equipment—ability to handle product and size interchange with ease and the ability to synchronize fully with other automatic units.

The rotary vacuum and gravity fillers handle free-flowing, semi-viscous and foaming liquids, filling metal, glass and plastic containers ranging in size from fractional ounces to gallons. Models available range in speeds from 40 to 400 per minute, and come equipped with from 8 to 40 spouts. Automatic overflow prevents product waste.

Container changeover—both in size or shape—poses no problem for these labelers. Adjusted in minutes, machines apply foil or paper labels of from "postage stamp" size to 6 inches wide by 7 inches long. Machines handle containers of from 1½ inches high by 1 inch dia. through 12 inches high by 7 inches dia. units. Labels are applied at speeds of from 40—150 per minute.

Both the filling and labeling machines are conveyor fed with variable speed drive to conform with other components.

For ordinarily difficult to bottle, liquids, the company is also showing its latest semi-automatic gravity and vacuum fillers. They include gravity and vacuum models that are equipped to fill high viscosity or foaming liquids in metal and glass containers of from frac-

tional ounces through gallons. Fillers are of the straight line type and may be included in conveyors of automatic or semi-automatic packaging and bottling lines.

MRM Co., Inc., Dept. PVP, 191 Berry St., Brooklyn 11, N. Y.

DISSOLVER
Locking Device

The "Daysolver," a new mixer, is built with a heavy-duty steel column, frame, and bridge, with oversize steel impeller shaft, to provide smooth, vibration less operation under extreme work loads.

The bridge swings in a 240° arc, which makes it possible to mix one batch with other drums of material positioned along the arc of swing, ready for mixing, thus making for practically continuous operation. A special locking device is built internally in the column, for positive locking of the arm. A hoist, operated by 80 lbs. of air pressure, cushioned at both ends of the stroke by an oil hydraulic circuit, provides rapid raising and lowering of the shaft and impeller.

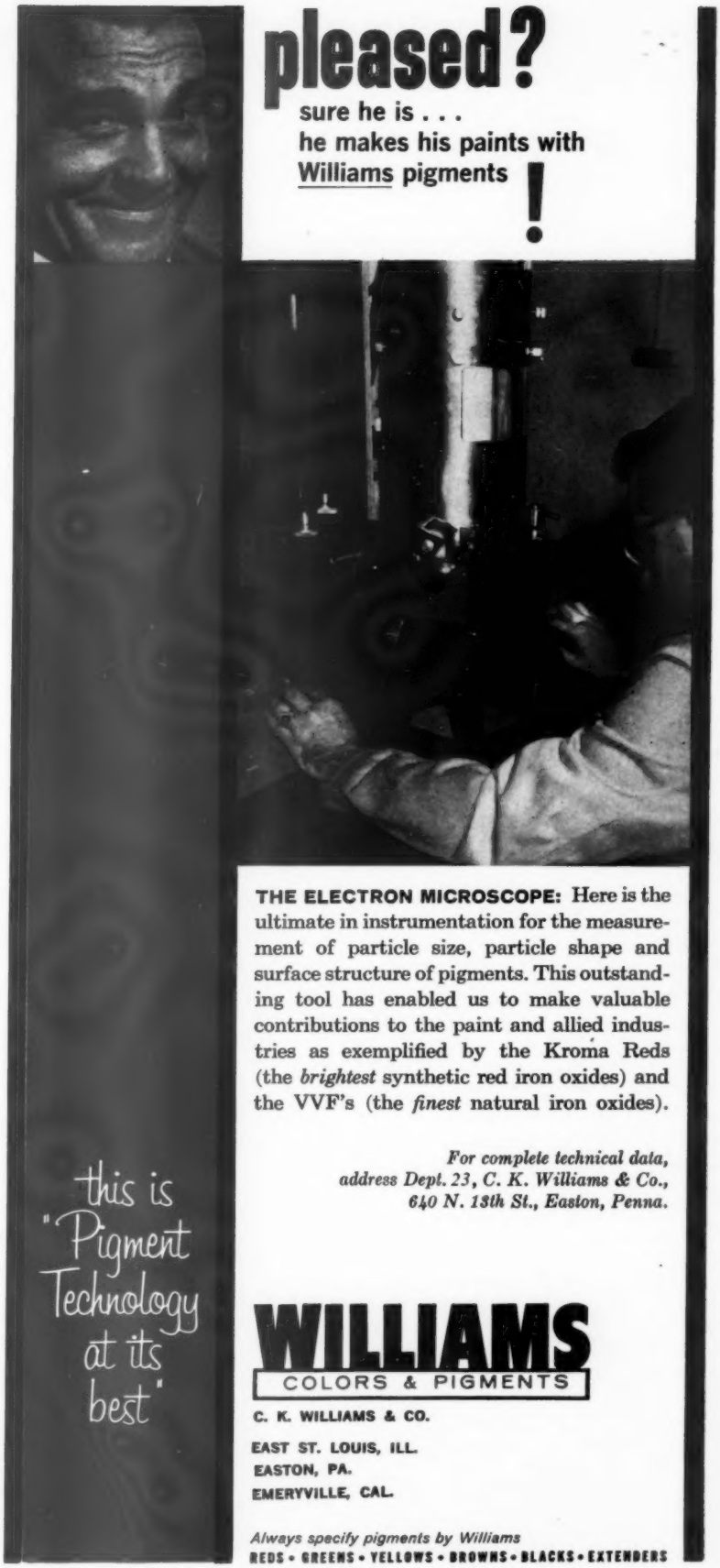
A variety of impellers are available, including the newly designed Day "Turbopeller" which combines five different mixing actions to provide exceptionally fast and thorough dispersion, particularly in heavier, more viscous solutions. Two speed or variable speed drives are supplied. The "Daysolver" is available in models for every mixing application, ranging from a laboratory size model to a large, 75 horsepower unit.

The J. H. Day Co., Dept. PVP, 4932 Beech St., Cincinnati 12, Ohio.

WEIGHING SYSTEM
1/10 of 1% Accuracy

New air-mount weighing system for weighing the contents of bins, tanks, truck tanks, conveyor loads and also anything that can be weighted on platform scales is now available for loads covering the entire range from 0-300 lbs. to 0-200,000 lbs.

Weber Air-Weigh Co., Dept. PVP, 13845 Elmira, Detroit 27, Mich.



Heyden looks at the classics



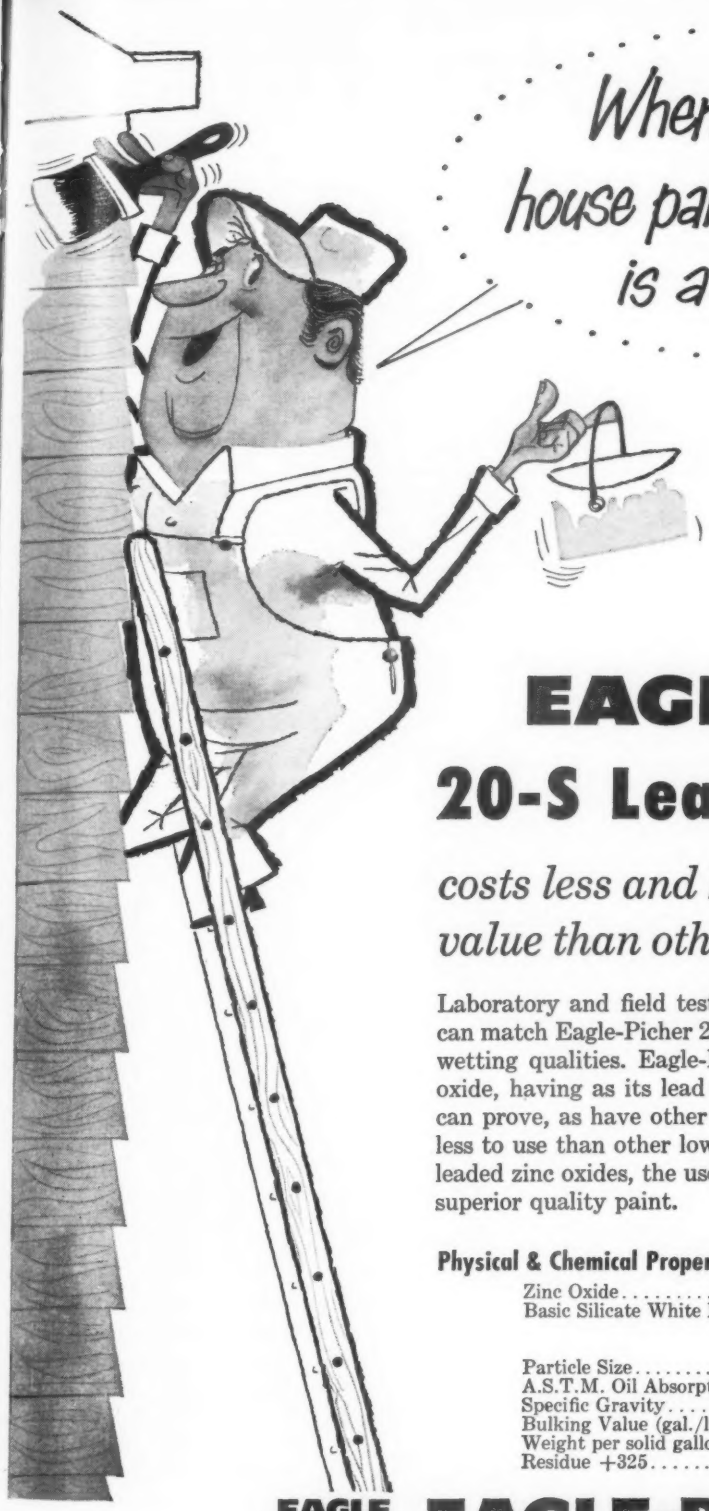
Francisco Goya (1746-1828). The Forge. Courtesy The Bettman Archive.

"I knew we'd have this gel trouble unless we ordered Heyden's uniform Pentek!"

For non-gelling alkyds – rely on Heyden. Next time, drop the hammer and specify uniform Pentek® or Monopentek®. 2109

HEYDEN CHEMICAL DIVISION

Heyden Newport Chemical Corp., 342 Madison Ave., N. Y. 17, N. Y.



When a low cost house paint formulation is a must!

USE EAGLE-PICHER 20-S Leaded Zinc Oxide

costs less and has higher bulking value than other low-leaded zinc oxides!

Laboratory and field tests prove that no other low-leaded zinc oxide can match Eagle-Picher 20-S for high bulking value or for grinding and wetting qualities. Eagle-Picher 20-S is a *twenty* per cent leaded zinc oxide, having as its lead content a basic silicate white lead. You too can prove, as have other manufacturers, that Eagle-Picher 20-S costs less to use than other low-leaded zinc oxides. Compared to other low-leaded zinc oxides, the use of Eagle-Picher 20-S provides a remarkably superior quality paint.

Physical & Chemical Properties of Eagle-Picher 20-S Leaded Zinc Oxide

Zinc Oxide	80%
Basic Silicate White Lead	20%
	100%
Particle Size	0.5 micron
A.S.T.M. Oil Absorption	12.
Specific Gravity	5.21
Bulking Value (gal./lb.)	.0230
Weight per solid gallon	43.50#
Residue +325	0.1

Since 1843

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The Eagle-Picher Company
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West Coast Sales Agent, THE BUNKER HILL COMPANY, Chemical Products Division
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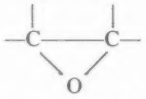
PATENTS

Complete copies of any patents or trade-mark registration reported below may be obtained by sending 50c for each copy desired (to foreign countries $1.00 per copy) to the publisher.

Vinyl Resin and Clay

U. S. Patent 2,912,397. Vladimir K. Hiuska, Bound Brook and Robert J. Lurie, Plainfield, N. J.

A composition suitable for use as *electrical insulation material*, said composition comprising, in admixture, 100 parts of vinyl resin selected from the group consisting of polyvinyl chloride and co-polymers of vinyl chloride and vinyl acetate containing at least about 95% of vinyl chloride in copolymerized form, from about 5 to 40 parts of unbleached clay, from about 2 to 10 parts of lead stabilizer, and from about 3 to 40 parts of at least one member selected from the group consisting of epoxidized fatty acids having from about 8 to 22 carbon atoms therein including the epoxy group and esters of said epoxidized

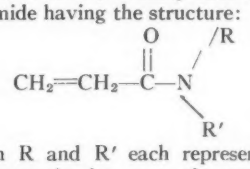


fatty acids with an acid esterifying compound selected from the group consisting of aliphatic alcohols, cycloaliphatic alcohols, aryl hydroxides and aralkyl alcohols.

Vinyl Chloride

U. S. Patent 2,914,498. Richard W. Quarles and William H. McKnight, Pittsburgh, Pa., assignors to Union Carbide Corp., a corp., of New York.

A resinous film-forming composition comprising an aqueous dispersion of a vinyl chloride polymer selected from the group consisting of polyvinyl chloride, copolymers of vinyl chloride and vinyl acetate containing at least 85% by weight of vinyl chloride polymerized therein, and copolymers of vinyl chloride and vinylidene chloride containing a predominant amount of vinyl chloride polymerized therein, and, per 100 parts by weight of said vinyl polymer, up to 3 parts by dry weight of a water soluble polymer of an N,N dialkyl-substituted acrylamide having the structure:



wherein R and R′ each represent an alkyd group having up to three carbon atoms, said composition being characterized by the ability to form a homogeneous single phase dry film.

Intumescint Coating Composition

U. S. Patent 2,912,392. Elmer K. Stilbert, Jr., Ina James Cummings, and Gerald E. Clock, Midland, Mich., assignors to The Dow Chemical Company, Mich., a corporation of Delaware.

An intumescent coating composition comprising a 40 to 60 percent aqueous dispersion of a mixture consisting of 70 to 85 percent of non-film forming intumescent solids and enough of an aqueous film forming latex of polyvinyl acetate to provide correspondingly from 30 to 15 percent of the polymer solids, based on the total weight of solids present; said intumescent solids consisting essentially of (1) a foam forming ingredient selected from the group consisting of monoammonium phosphate, diammonium phosphate, phosphoric acid, ammonium sulfate, sulfamic acid, ammonium sulfamate, ammonium bromide, sodium tungstate, and sodium borate; (2) from 10 to 70 percent, based on the weight of the foam forming ingredient, of at least one polyhydric compound from the class consisting of starch, the hexitols, the pentitols, and the mono-, and ditetritols, the amount of any starch employed being less than 15 percent of the weight of said foam forming ingredient; and (3) not more than 55 percent, based on the weight of the foam forming ingredient, of an amino compound from the group consisting of glycine, urea, dimethyl urea, guanyl urea, guanidine, and dicyandiamide.



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Patrician Yellow
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Regal Orange
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All pigments offer unique properties of lightfastness, heat resistance, tinctorial strength and chemical resistance.

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R-B-H Dispersions

INTERCHEMICAL CORPORATION
Color & Chemicals Division
HAWTHORNE, New Jersey

Pigment dispersions in nitrocellulose; ethyl cellulose; urea formaldehyde; vinyl and alkyd resins; chlorinated rubber and other plastic binders.

R-B-H, PRINCESS YELLOW, PATRICIAN YELLOW, ROYAL MAROON, REGAL ORANGE AND AURELIAN BRONZE ARE TRADEMARKS OF INTERCHEMICAL CORPORATION

Stabilization of Petroleum Waxes

U.S. Patent 2,910,373. Joseph A. Chenicek, Prairie View, Ill., assignor, by mesne assignments, to Universal Oil Products Company, Des Plaines, Ill., a corporation Delaware.

Petroleum wax subject to oxidative deterioration containing, as an inhibitor against said deterioration, a stabilizing concentration of a beta-alkyl-thioamide having at least two carbon atoms in straight chain arrangement with the carbon atom of a carbonyl group, a sulfur atom on the carbon atom beta to the carbonyl group and a nitrogen atom attached to the carbon atom of the carbonyl group.

Magnetic Coating Composition

U. S. Patent 2,914,480. Jacob J. Hagopian, San Jose, Calif., assignor to International Business Machined Corporation, New York, New York, a corporation of New York.

A magnetic paint consisting essentially of: about one part of a mixture having approximately the following composition:

	Percent by weight
Red magnetic iron oxide pigment	72.6
Urcured butylated melamine formaldehyde resin	10.0
Polyvinyl butyral resin	17.4

about three parts of a mixture having the following composition:

	Percent by weight
Toluol	51.6
N-butanol	27.8
Ethanol	15.8
Xylol	1.6
Methyl ethyl ketone	3.2

and about 5 percent by weight of the total composition of phosphoric acid.

Preparation of Drying Oil

U. S. Patent 2,912,398. Alexander Schwarcman, Buffalo, N. Y., assignor to Spencer Kellogg and Sons, Inc., Buffalo, N. Y.

The method of improving the film forming characteristics of soy bean oil which comprises first heating the oil at a temperature of 400°F. to 500°F. with from 1% to 7% of pentaerythritol, on the weight of the oil, until alcoholysis is effected, adding a like amount of maleic anhydride to the mixture, heating being continued at a temperature of above about 500°F. to modify the oil and until an oil of low acid number and a Gardner-Holdt viscosity in the range of about H to Z2 is produced and thereafter heating 60 to 40 parts by weight of such modified oil in the range 300° F. to 600° F. with 40 to 60 parts by weight of vinyl toluene in the presence of a catalytic amount of an organic peroxide until copolymerization is effected and a fast drying oil produced.

Oxygenated Terpenes

U. S. Patent 2,911,442. Joseph P. Bain and Wilbur Y. Gary, Jacksonville, Fla. assignors to The Glidden Co., Cleveland, Ohio, a corporation of Ohio.

The process for producing 3-pinene-2-ol and pinene oxide which comprises oxidizing α-pinene with gaseous oxygen under substantially anhydrous conditions to produce a mixture of oxidation products containing hydroperoxides and pinene oxide and decomposing the hydroperoxides in said mixture by treating the mixture of oxidation products with a reducing agent for peroxides under aqueous alkaline conditions, the amount of alkaline material being sufficient to maintain the alkaline condition throughout the reduction treatment, whereby there is produced a mixture containing 3-pinene-2-ol and pinene oxide.

Polyvinyl Acetate

U. S. Patent 2,914,495. Phillip L. Gordon and Albert E. Cohen, Lynn, Mass., assignors to The Borden Co., a corp. of New Jersey.

A water paint comprising an intimate mixture of an aqueous emulsion of the product of polymerizing 100 parts dry weight of vinyl acetate in contact with (1) an activator of polymerization of vinyl acetate, (2) 2-10 parts of pregelatinized waxy maize starch in solution in water at all times during the polymerization, and (3) 0.5-5 parts of a surfactant selected from the group consisting of anionic and nonionic surfactants, the said emulsion serving as the vehicle for the paint; and 20-200 parts of paint pigment admixed with the said vehicle, the vinyl acetate being in substantially completely polymerized condition.

PARLON®

(Hercules chlorinated rubber)

For Finishes You Can Sell

Balanced Properties

Fast drying . . . tough . . . durable . . . good-looking . . . nonflammable . . . resistant to alkalies, acids, chemicals, corrosion, salt spray . . . easy to formulate . . . easy to use.

Widespread Utility

Parlon S5 (4-7 cps.) In printing inks, spray-applied product finishes, machinery enamels.

Parlon S10 (9-14 cps.) In spray-applied product finishes, machinery enamels, chemical-resistant maintenance paints, masonry paints, fire-retardant paints.

Parlon S20 (17-25 cps.) In spray or brush-applied product finishes, machinery enamels, chemical-resistant maintenance paints, masonry paints, fire-retardant paints, marine finishes.

Parlon S125 (125-200 cps.) In adhesives, paper and textile coatings, brush-applied paints for most of the above applications.

Parlon S300+ (300+ cps.) In adhesives, textile and paper coatings.



CR59-4

Cellulose Products Department

HERCULES POWDER COMPANY

INCORPORATED

900 Market Street, Wilmington 99, Delaware

TECHNICAL Bulletins

PAINT ADDITIVE

New bulletin describes free-flowing viscous liquid which may be added to a paint formulation at any point in the manufacturing operation.

JEL-O-MER is a special additive designed to give desirable properties to "trade sales paints." Incorporation of from 0.1% to 5.0% JEL-O-MER by volume in the finished enamel, flat wall paint, and so forth, will produce the following advantages:

1. Resistance to sagging and excessive run-off from the brush. A unique range of "controlled thixotropy" is obtained in the finished paint which remains fluid in the can but holds when applied to vertical surfaces.
2. Pigment settling is minimized.
3. Brushability and levelling properties are not adversely affected.

The controlled thixotropy induced by the use of JEL-O-MER will vary depending upon the vehicle base used (long-oil alkyd, flat alkyd, varnish, etc.) and the type solvent used in the vehicle base. Differences in the effect produced by JEL-O-MER will be observed among systems containing regular, low odor or odorless mineral spirits.

It has been found that, while the addition of JEL-O-MER alone produces a slight increase in the KU viscosity of a paint, the desired "controlled thixotropy" is achieved only through the trigger action of driers incorporated in the paint. To achieve maximum effect, approximately equal amounts of JEL-O-MER and drier catalyst should be used. Calcium naphthenate has proven most effective and is recommended. Other driers, notably cobalt, react to produce desirable flow and application properties, but to a lesser degree than calcium.

Reichhold Chemicals, Inc., Dept. PVP, White Plains, N. Y.

EQUIPMENT LEASING

A new edition of equipment leasing for smaller manufacturers, department stores and supermarkets has just been issued.

Included in the study are data tables and charts analyzing the comparative costs of leasing, outright cash purchase, and purchase by conditional sales contract. In addition, charts analyzing cash flow are included.

Set out in detail are analyses of specific situations where it is advantageous to lease equipment and situations where it is disadvantageous.

Foundation for Management Research, Dept. PVP, 121 West Adams St., Chicago 3, Ill.

TRUCKS

A copy of a new folder outlining the advantages of trucks engineered and manufactured for specific plant and warehouse materials handling problems has been published.

Among the trucks of original design covered in the folder are the following: underslung trailer for drums, barrels and other heavy units, heavy duty die truck for moving dies, jigs, fixtures, forgings or stampings in factories or production shops, heavy duty trailers, book trucks where drying and curing sheets or parts must be separated, and utilities racks on wheels.

FLEXBOND 800

EXTERIOR LATEX HOUSE PAINTS EXCEL IN EASE OF APPLICATION AND FORMULATION



Exterior latex water-based house paints formulated with Flexbond 800 exhibit qualities approved by customers, dealers and formulators alike. Flexbond 800 paints are truly easy to apply; dry quickly to a soft, flawless finish; are outstanding for whiteness and color brightness.

Paint manufacturers using Flexbond 800 vinyl copolymer emulsions enjoy profit advantages in paints that offer ease of formulation—each resin molecule contains built-in plasticizers and promotes superior color retention.

Flexbond 800 paints start clean, stay clean . . . are free from chalking and staining . . . are blister- and dirt-resistant, non-yellowing. They form a flexible, breathing vinyl film ideal for repainting wood and for all masonry surfaces.

COLTON COLTON CHEMICAL COMPANY

A Division of Air Reduction Company, Incorporated • 1747 Chester Avenue, Cleveland 14, Ohio
Sales Offices and Warehouse Facilities Throughout U. S. Export: Airco Company International, New York 17, N. Y.

AT THE FRONTIERS OF PROGRESS YOU'LL FIND . . . AN AIR REDUCTION PRODUCT

Other units include a stock trailer with chart holder for speeding up stock selection and movement in grocery or other warehousing by hand or in train with overhead towline, four-wheel steering trailer for use in narrow aisles, trailer with ribbed duck for moving grocery stock without pallets, a dolly trailer with automatic controls integrated with a towveyor for moving engines of various sizes in plant manufacture, and a turn table tilt truck for all-purpose use which turns on its own radius.

Palmer-Shile Co., Dept. PVP, 12622 Mansfield, Detroit 27, Mich.

HYGIENE

Four new additions to a list of hygienic guides, brings the total to eighty-four. Titles of the new guides are *Parathion, DDT, Thorium and Its Compounds, and Teflon Tfe-fluorocarbon Resins and their Decomposition Products.*

The guides are composed of four main divisions, namely: 1) Hygienic Standards 2) Significant Properties 3) Industrial Hygiene Practice 4) Specific Procedures. An exhaustive list of references is given for each guide.

The hygienic guides bring together in one publication all of the pertinent available information on toxicity, evaluation of exposure, control measures to be taken, and medical procedures to be followed in the treatment of persons suffering from over-exposure.

American Industrial Hygiene Assn., Dept. PVP, 14125 Prevost, Detroit 27, Mich., the cost is 25c each subject.

CASE OPENER

New, completely illustrated, four-page file size brochure, describing an automatic four-flap case opener, has been published.

Printed in two colors, this attractive and informative brochure explains and illustrates the smooth, straight-line forward motion of the improved automatic four-flap case opener and its many features. Model CFO-2 handles cases from 9 inches wide to 4 inches high to 14 inches wide and 11¾ inches high with length immaterial, at a speed of 30 or more cases per minute.

Geo. J. Meyer Manufacturing Co., Box 452, Dept. PVP, Milwaukee, Wis.



has widespread applications

This basic, versatile chemical is used in the formulations of
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ORGANIC CHEMICALS

New 28-page physical properties booklet, describing more than 400 synthetic organic chemicals, has been published.

Booklet contains information on applications, physical properties, and shipping data. Included are alcohols; acids; anhydrides; chlorine compounds; esters; ethers and oxides; glycol-ethers; glycols and triols; ketones; monomers; Carbowax polyethylene glycols; metallic salts; nitrogen compounds; cyclic compounds; Flexol plasticizers; polypropylene glycols; Ucon fluids, lubricants, and fluorocarbons; Tergitol surfactants; Polyox water-soluble resins; Cellosize hydroxyethyl cellulose; new chemicals for evaluation; and chemicals for special applications.

Union Carbide Chemicals Co., Dept. PVP, 30 E. 42nd St., New York 17, N. Y.

PVP/VA COPOLYMERS

An expanded and comprehensive bulletin on new types of commercially available vinylpyrrolidone/vinyl acetate copolymers and their numerous applications has just been issued. These materials were first introduced as 50 per cent ethanol solutions. They are now available in various physical forms as well as in several monomer ratios. Solid, emulsion and solution types now provide specific materials suitable for diverse processing conditions and product requirements, and for use in aqueous as well as organic solvent or aerosol systems.

This two-color, 20-page publication outlines recently developed uses of these acetylene-derived chemicals. Technical data are presented in charts, and practical formulations are given for use in adhesives, hair-grooming agents, protective films, shoe polish, plant spray, decorative sprays, and anti-tarnish coatings.

PVP/VA copolymers exhibit distinctive adhesive and film-forming properties with specific affinity to smooth surfaces, such as wood, glass, paper, metal and hair. Films formed by individual members of the group feature adhesiveness, transparency, luster, hardness, and water rewetability, and do not require volatile solvents for removal.

The new bulletin also describes stability factors, viscosity ratings, compatibility and physiological data.

Antara Chemicals, General Aniline & Film Corp., Dept. PVP, 435 Hudson St., New York 14, N. Y.

FLATTING AGENT

Technical data sheet, I-177, on Santocel FR-C, the company's improved silica aerogel flatting agent has been published.

A microscopically-divided silica aerogel, pure white and free flowing, the product has been tailored specifically to meet the needs of the surface coating industry for more effective and economical flatting of nitrocellulose and vinyl lacquers.

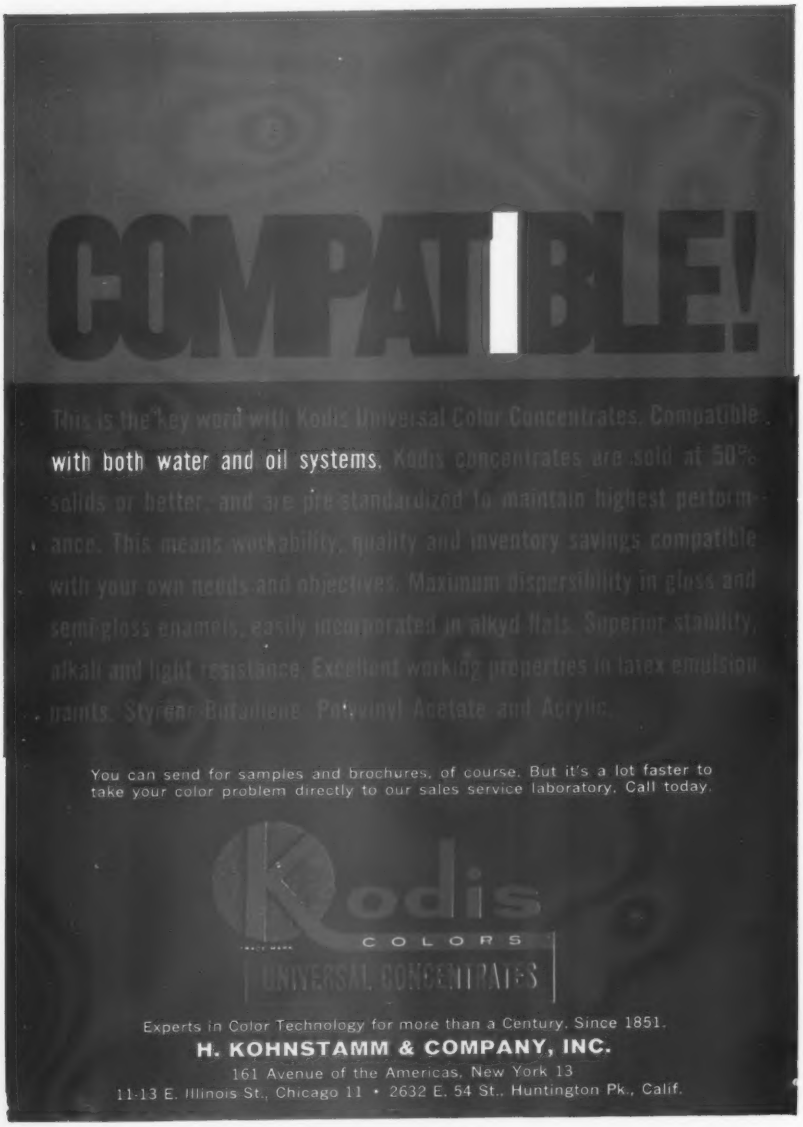
The data sheet describes the physical and chemical properties of the product as well as both nitrocellulose lacquer and vinyl lacquer performance records.

Inorganic Chemicals Div., Monsanto Chemical Co., Dept. PVP, 800 N. Lindbergh Blvd., St. Louis 66, Mo.

DIGLYCIDYL ETHER

New technical information bulletin entitled "Kopoxite 159 Resorcinol Diglycidyl Ether (RDGE)" has been issued. Purpose of the new literature is to introduce a new resorcinol-based resin, which is now being made available in development quantities for customer evaluation.

KOPOXITE 159 is a versatile



liquid epoxy resin composed primarily of resorcinol diglycidyl ether. KOPOXITE 159—two epoxy groups in a small aromatic molecule—offers the highest epoxy concentration available in an aromatic diepoxide.

In addition to a summary of the chemical and physical properties of the new resin, the technical information bulletin presents complete information on the following subjects, related to the new product: Use of KOPOXITE 159 with other resins, Applications, Curing Systems for KOPOXITE 159, Reactivity with typical curing agents, Casting Compositions and Cure Schedules, Mold Release Agents, Pot Life, Gel Time, Adhesives, Coatings, Toxicity, and Storage Stability.

Chemicals and Dyestuffs Div., Development Dept., K-2967-PVP, Koppers Company, Inc., Pittsburgh 19, Pa.

HYDROXYETHYL CELLULOSE

New 16-page booklet, describing the properties and uses of cellosize hydroxyethyl cellulose, has been published.

Booklet contains extensive data on properties, preparation of solutions, film and coating properties, preparation of water-insoluble films, applications, toxicological properties, specification limits, shipping data, and test methods.

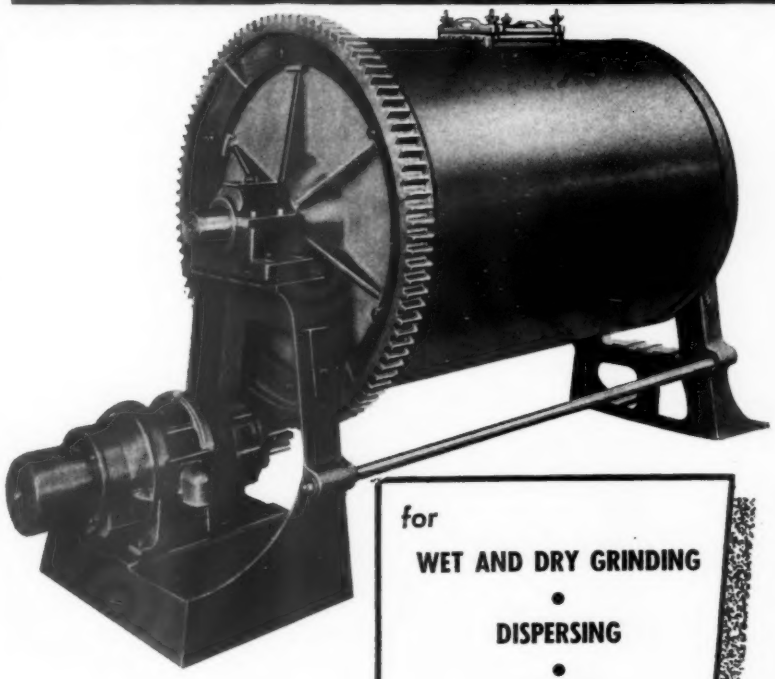
Cellosize hydroxyethyl cellulose is a nonionic synthetic colloid that is readily soluble in hot or cold water. It has excellent tolerance for dissolved electrolytes. It can be used as a thickener, binder, stabilizer, protective colloid, film-former, or coating. Cellosize hydroxyethyl cellulose is used in latex paints, paper and textile treating, lithographic solutions, cosmetics, electroplating and electro-refining, dry-molding of ceramics, adhesives, plastics, rubber, agricultural sprays, dusts, wettable powders, leather dressing, detergents, aniline inks, finer paints, show-card colors, and decalcomanias.

Union Carbide Chemicals Co., Dept. PVP, 30 E. 42nd St., New York 17, N. Y.

INSPECTION LIGHT

Inspection light and view ports which are heat-resistant, pressure-

ABBÉ Engineering Ball and Pebble Mills



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•
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PROCESSING



ABBÉ Engineering Ball and Pebble Mills are available in capacities from 30 lbs. (dry), 5 gal. (wet), to 14,000 lbs. (dry), 2500 gal. (wet).

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Write for Catalogs 73 and 77 and complete data.

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620 K Graybar Bldg., New York 17, N. Y.
Designers and Manufacturers of
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tight and dust-proof, are fully described in a new bulletin.

The viewer has excellent visibility in observing chemical reactions, combustion and other processing operations within equipment such as ovens, dryers, dehydrators, at a glance. He can do this with ease, safety and great convenience.

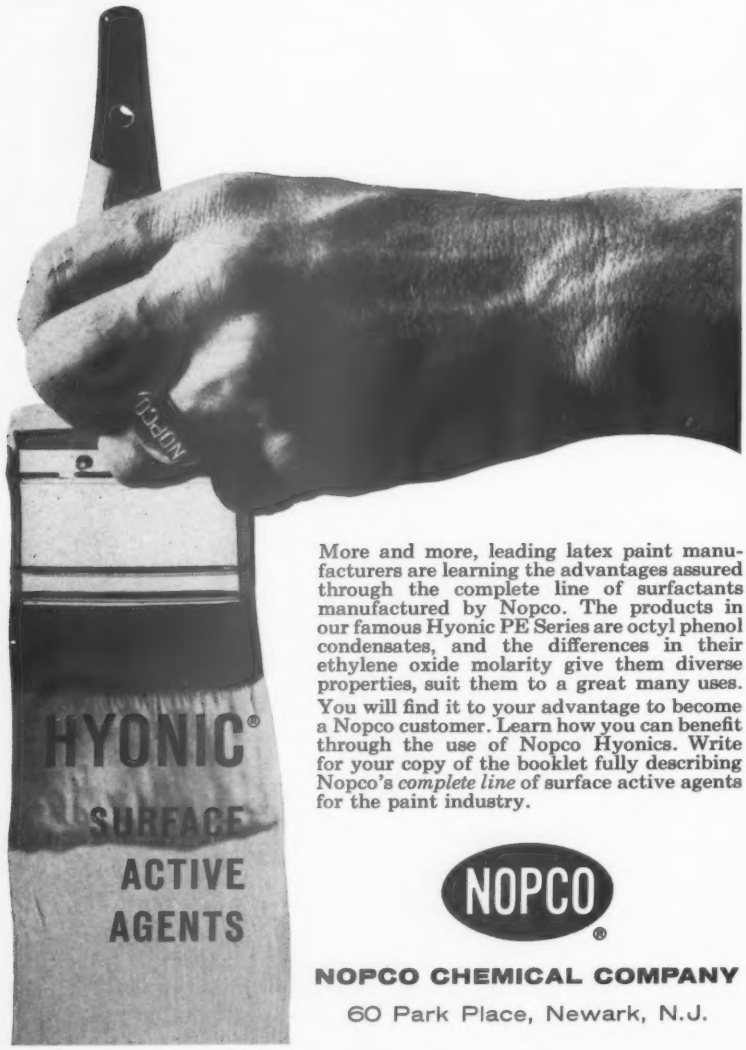
The light consists of a heavy-duty globe which is inserted into the outside casing or housing of the equipment in use. The vibration-proof lamp is attached to the inner side of the casing and to the aluminum or alloy steel frame made by Wager.

The high visibility glass of the inspection light and view ports is made either of annealed or tempered pyrex glass for use at temperatures up to 900° F. and pressures to 300 psi.

Bulletin describes features of the inspection light and the view ports (of which the latter are available in sizes of 4″ and 6″ respectively). These features include the impermeability of both units to corrosive liquids or fumes; ease of changing bulbs from outside without interference to equipment operation, and standard or vibration-proof lamp holder for inspection light blub.

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Chempump Div., Fostoria Corp., Dept. PVP, P. O. Box 35-7 Huntingdon Valley, Pa.

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A two-page catalog sheet has been issued to describe surface mounting temperature controls Series 30000. Three types are used: two for the general 50—300°F., range; one for 50—600°F. All units are adjustable.

The catalog sheet gives complete specifications on this low cost series of controls, and also provides details on 11 different modifications which can be added to them.

Fenwal, Inc., Dept. PVP, Pleasant St., Ashland, Mass.

EXTERIOR PAINTS

New 54-page soft-cover book giving detailed information on the results of a six-year study of applications and exposure tests of exterior paints made with "Rhoplex AC-33," 100% acrylic resin emulsion, is now available. The book, designated *Probress Report #6* contains 17 tables of formulations, applications, and test results, and will be of interest to paint manufacturers, architects, and specification writers.

"Rhoplex AC-33" was introduced to the paint industry in 1953. The polymer in this emulsion is tough, adherent, flexible, color retentive and resistant to ultraviolet light, alkalies and moisture. Six and one-half years of outdoor exposure experience confirmed the properties.

The newly published book covers both commercial paint jobs and data on test panels. Materials on which the panel study was made include wood surfaces, asbestos-cement shingles, stucco, concrete blocks and cement.

Details are given on commercial applications in various climates. Several types of painted structures including homes and industrial plants are shown in the 24 photos in the publication.

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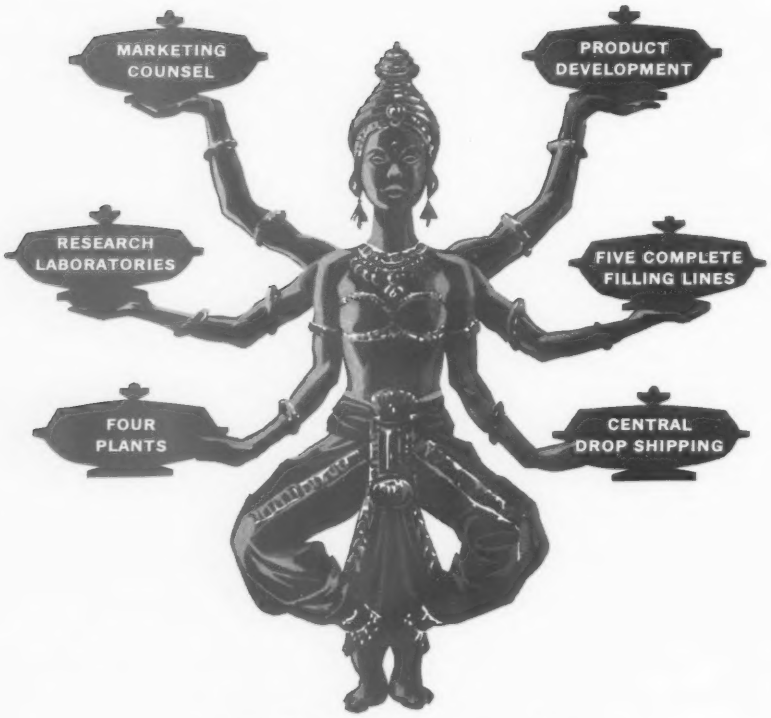
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DEVELOPMENTS IN AEROSOL COATINGS

Part I

By
E. G. Roberts

AS aerosol coatings enter 1960, a year when they may well become the largest single aerosol category, it is desirable to take stock technically of their growth and be prepared to move on to their greater use in home and industry.

Actually, this marks the 13th year of the production and marketing of aerosol paints and coatings. High pressure insecticide bombs were developed during World War II, subsequent to which the modifying of the beer can permitted the merchandising of consumer aerosols as we know them today. In 1948, one year after low pressure insecticides appeared, formulation of clear acrylic coatings as aerosols permitted their successful marketing. The first pigmented aerosol paints appeared in 1949. Their growth was slow at first, only ½ million units being produced in 1948 and by 1951, the first year of the industry survey, about 3 million cans of clear and pigmented coatings were packaged.

The modification of true aerosols such as insecticides to yield coarse sprays suitable for paints was not easy. The early work by Dupont on compatibility of paints and lacquers with their propellents was of great value to the emerging industry. Kauri-Butanol values of propellents and other solvents are given in their KTM#3. (1)

Dittmar(2) in 1950 highlighted some of the problems of the struggling aerosol paint industry. Speaking before the Chemical Specialties Manufacturers Association he said:

"This appears to be a sick branch of your industry. Insecticides, waxes, polishes, and lately cosmetics are booming, but not paints. Why?

"The answer to this question, I believe, can be found in an examination of the technical and economic aspects of the business and merchandising techniques employed."

Dittmar listed consumer complaints of inoperable cans as mainly due to valve clogging and hard settling of the pigments. He then gave a discussion of aerosol lacquers, mainly ethyl cellulose based, as being best suited for solubility, spraying and quality of the finished film as well as can stability and pigment settling. Twelve-ounce cans were the largest available at that time. He stressed the convenience for touch-up purposes as their greatest appeal to the consumer.

At the 38th Mid-year meeting of the CSMA, June 1952, a paint symposium reviewed many problems of the industry. Ellis (3) spoke of the many industrial applications of pressure propelled lacquers. Their use in touch up kits for appliance manufacturers was a big factor in the more rapid growth of aerosol paints which took place at this time. The paint industry as a whole did not welcome aerosols but the appliance industry found them to be the best answer to the spray touching up of small scratches on refrigerators, washers, etc., which inevitably occurred in their installation. These were primarily nitrocellulose base lacquers. Clear vinyl sprays were mentioned to supplement the acrylics.

At the same meeting Gregory(4) discussed the technical problems of the new industry: material specifications, suitability of valves and containers, and the limited performance of filling equipment. He said:

"It was thought that the ordinary four-hour enamel, which was compatible with the propellent, could be thinned down to proper spraying viscosity and thereby solve the problem of formulating a product. Coverage and flow-out could be adjusted by the addition of certain chemicals and solvents. This, of course, was found to be wishful thinking, and by now we know that for a good aerosol product it is necessary to have the paint made to aerosol specifications."

Gregory also observed that paint aerosols were beginning to find their true place in the consumer

	Typical Cold-Spray NC Lacquer Formulation	Typical Aerosol Lacquer Formulation
RS Nitrocellulose, ¼ sec.	8.7	5.2
Nonoxidizing alkyd	8.7	5.2
Dibutyl Phthalate	2.6	1.8
Butyl Acetate	28.0	
Butanol	12.0	
Toluene	40.0	
Methyl Isobutyl Ketone		30.2
Butyl Cellosolve		3.9
Isopropanol		1.9
2B Alcohol		1.8
"Freon-12"		50.0
Total	100.0	100.0
Approx. % Total Solids by Weight	20.0	12.2
Approx. % Total Solids by Volume	15.3	10.0

(from Phillips and Lawton. Proc. CSMA June, 1952.)

Table 1

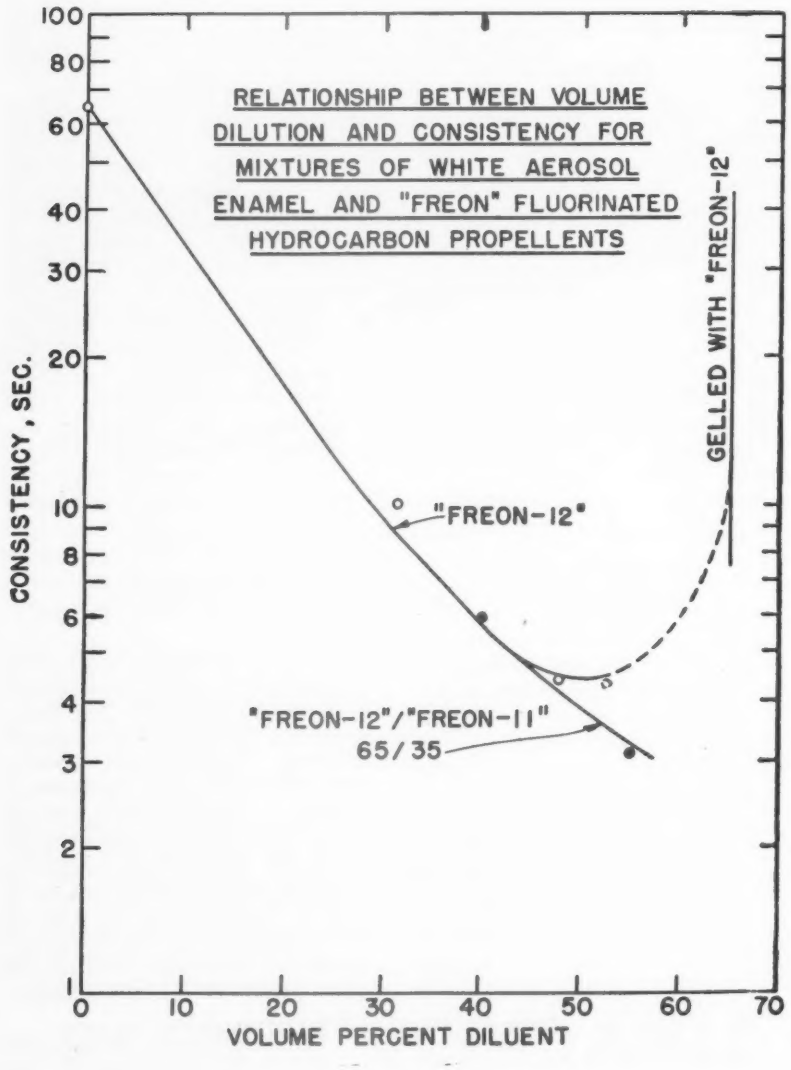


Figure 1

market for touch up, and that it was futile to expect them to be used for painting large areas as walls, etc.

A more technical part of the symposium was paper by Morrow and Palmer(5) on a method of determing pressure and consistency of aerosol coatings. They indicated that the spraying characteristics of a paint were primarily influenced by valve design, propellent pressures and the viscosity of the mix. We quote the authors:

"In the development of aerosol coatings formulas, it is highly desirable to be able to relate the performance of experimental compositions to changes that are made in pressure and viscosity, and, in turn, to determine how these properties vary with changes in the amount and type of thinner and propellent used. The determination of pressure on aerosol products presents no great problem, but the usual methods of measuring consistency of paints and lacquers are not directly applicable to aerosol products of this type, since they are designed for use at atmospheric pressure."

An apparatus for determining pressure and consistency of coatings in aerosol containers is described. They did not go into the details of formulation but made the following observations in the use of their data.

1. "These data can be combined with observations of spraying characteristics and film properties to give a pressure consistency chart which will show broadly the regions of satisfactory and unsatisfactory performance.

2. "The adjustments in composition required to fix the consistency in the desired range can be determined by use of curves of the type illustrated in Figure 1, in which the logarithm of the consistency is plotted as a function of the volume percentage of "Freon" propellent added to a typical white aerosol enamel concentrate.

3. The curves in Figure 1 merely show the extent to which the consistency of the aerosol mixture is reduced by addition of a given quantity of "Freon" fluorinated hydrocarbon propellent. However, similar plots can be employed for thinning solvents (non-propellents) and the slope of the consistency-



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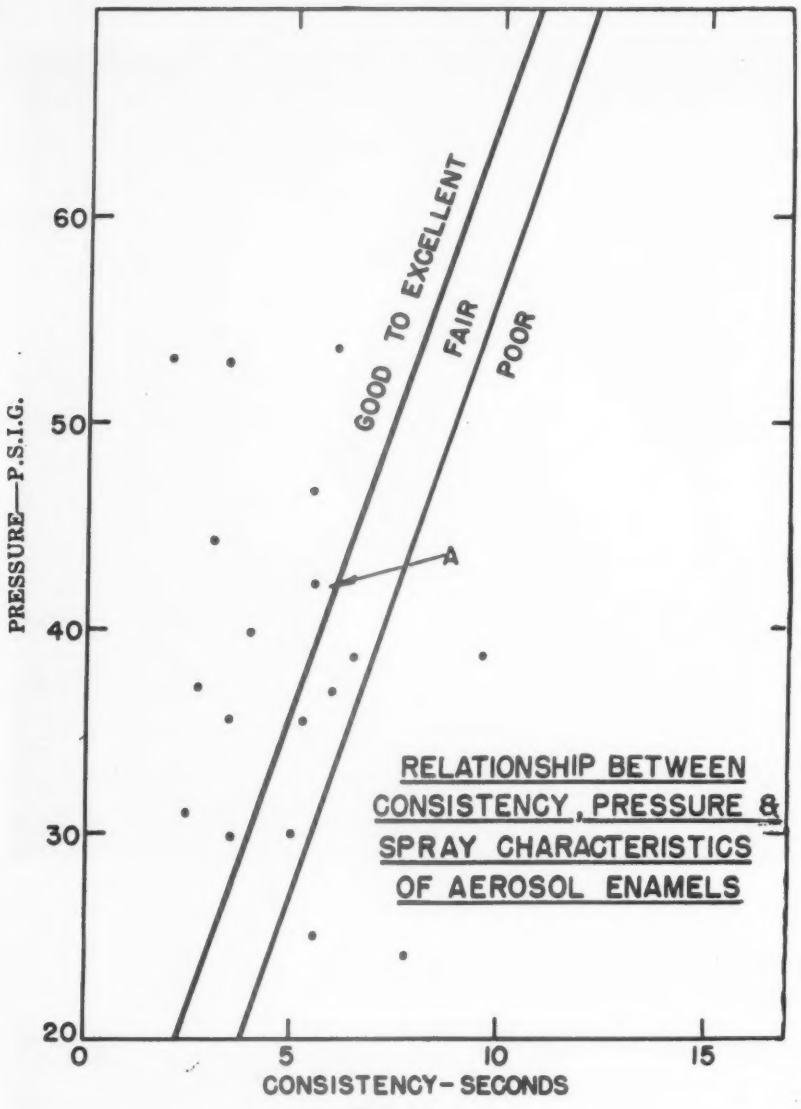


Figure 2

composition curve can be used as an index of the thinning efficiency.

4. Marked changes in slope of the consisting composition curve such as are shown by the curve for "Freon 12" (dichlorodifluoromethane) in Figure 1 can be used as an indication of incipient gellation."

At the same CSMA meeting Philips and Lawton (6) discussed nitrocellulose aerosol lacquers. Their work showed also that "Freon 12" gave the best results for miscibility and pressure. Lower pressure propellents required a greater percentage usage to give the proper atomization. "Freon 12" has a pressure of 79 lbs. (94 abs) at room temperature and works best in a 50:50 lacquer to propellent ratio. The lacquer was thinned to about 18 seconds (No. 4 Ford cup). They give a comparison of a typical cold-spray lacquer and a typical aerosol lacquer, (See table 1).

This gave a final pressure of 55 lbs. gage, the highest permitted by ICC for 2P containers. Regular containers permit only to 40 lbs. gage. Philips and Lawton also described both cold and pressure methods of filling paints. The use of small steel balls or porcelain marbles in the can to aid dispersion of settled pigments is mentioned. Particle sizes encountered were in the range of 100 to 200 microns which is larger than that encountered with conventional spray guns, usually less than 100 microns for cold spray atomization.

Of interest also to the aerosol paint industry at the same meeting was the report (7) of the Sub-Committee on Flammability Tests of Self-Pressurized Containers, CSMA Scientific Committee. These included the Flame Projection Test, Modified Tag Open Cup Test, and the Drum Test. These tests are still in use and have been made part of the ICC regulations (8) for the shipments of all aerosol containers including paints.

Palmer and Morrow(9) at the Dec. 1952 CSMA meeting discussed the formulation of aerosol enamels using mostly drying-oil alkyd resin clears but also applying the principles learned to pigmented enamels. They found a 50:50 solution of "Freon 22/Freon 12" fluorinated hydrocarbons more effective than "Freon 12" alone. We quote from their paper:

"It is found that excellent sprays are produced with these resin solutions if the consistency is 6.0 sec. and the pressure is 40 psig or more. When "Freon 12" is used as the propellent, these conditions are met with a loading of 31 vol. per cent (40 wt. per cent) but, with the 50/50 solution of "Freon 22/Freon 12" only 23 vol. per cent (30 wt. per cent) is required. Thus, a higher solid package (21% vs. 18%) can be produced with the latter propellent." The formulations used are given in Table 2. The interrelation between consistency, pressure and spraying characteristics are given in their Figure 2.

Palmer and Morrow also generalize about some of the defects of aerosol paints and means of correcting them. Sagging can be controlled by the proper proportions of solvent and propellents. Additions of small amounts of alcohols or ketones can also be helpful. A more volatile propellent may eliminate orange peeling or the same result may be obtained by changes in the solvent system to make it more tolerant of moisture.

At the May, 1953 CSMA meeting another symposium on paints was held. Body(10) stressed the various factors in getting the proper quality to the consumer. He stated that pigments should be used only in the quantity to produce satisfactory hiding, particularly on whites and light colors. Excessive pigmentation, though re-

Component	Formula A	Formula B
Aroplaz-1365X (60% resin)	30% wt.	35% wt.
Mineral Spirits	25.8	30.1
Methylisobutylketone	4.2	4.9
"Freon 12"	40	....
"Freon 22/Freon 12" (50/50)	....	30
Consistency-sec	6.0	6.0
Pressure-psig	42	47
Resin Solids	18	21
Spray Rating	Excellent	Excellent

(from Palmer and Morrow, Proc. CSMA. Dec. 1952.)

Table 2

ducing cost and selling price, is the principal cause of excessive settling. Inert pigments should not be used in aerosol paints.

At the same meeting Nichols (11) listed three general types of aerosol products being marketed:

1. Pigmented paints or enamels
2. Pigmented lacquers
3. Clear or unpigmented finishes, including varnishes, acrylics, lacquers and vinyls.

He stressed that paints should be specially formulated for aerosol packaging. The Ordnance Corps. of the U. S. Army specification for a clear acrylic coating is discussed.

At the same symposium Palmer (12) presented some of his additional work on aerosol lacquer formulation, utilizing the same techniques as given in previous papers. Other than product formulation, Palmer outlined the importance of proper valve selection in obtaining proper spray quality. Too high delivery rate is given as the most frequent defect in paint valves. With these it is difficult to apply a uniform coating without flooding portions of the surface and resulting in sagging, bubbling and cratering. Only a valve of good design will provide adequate latitude in the manipulation of the spray head to give a good sprayed surface. Valve orifices sizes in range of 0.016" to 0.020" appear to be best for most coating compositions. Satisfactory atomization can be obtained at 14-15% solids with a given formulation on some valves, but with a less desirable valve the solids might have to be reduced to 10%.

The volume of aerosol coatings produced yearly through 1953 was still relatively small, being about 13 million units in that year. Coatings ranked fifth in a total yearly volume of all aerosols of 140 million units. Paints were surpassed in volume by insecticides, shave creams, room deodorants and hair spray.

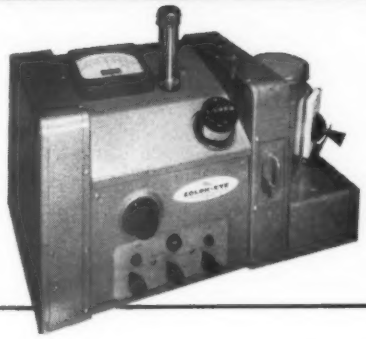
The big production upswing in paints was yet to come with the introduction of the 16 oz. can in 1956 and the general acceptance of paint aerosols by the large paint marketers. The industry was laying the necessary technical groundwork to satisfy future needs.

(To be continued)

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12. Palmer, F. S., "Formulation of Aerosol Lacquers". Proc. CSMA, May, 1953.

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FORECAST

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During the last few years, the paint field has been experiencing the same kind of revolutionary sales impact that aerosol packaging has had on hair sprays, insecticides, shave creams and many other popular products. Last year, sales of aerosol paints to the "do-it-yourself" home market reached a total of 55 million cans valued at $71.5 million. This represents a spectacular increase over the 36.1 million units sold for $46.9 million in 1957 and the 21.3 million units sold for $27.7 million in 1956. And it appears to be just the beginning!

Areas of future growth

There are 3 distinct markets for aerosol coatings:

1. **The standard coating market (primarily cans of 1 pint or less)**
2. **New acrylic lacquers and resins**
3. **Specialty coatings**

First, let's look at the percentage of standard paint sales that aerosols can expect to command.

1. The standard coating market

Current yearly production of standard paints for home use is distributed in the following can sizes:

Can-Size	Gallons Produced
¼ pint	171,200
½ pint	2,110,400
1 pint	9,868,800
1 quart	63,425,600
1 gallon	84,424,000
Total gallons	**160,000,000**

It is estimated that aerosol packaging could capture:

95% of the ¼ and ½ pint can sales (2,167,520 gallons)
50% of 1 pint can sales (4,934,400 gallons)
5% of 1 quart cans (3,171,280 gallons)

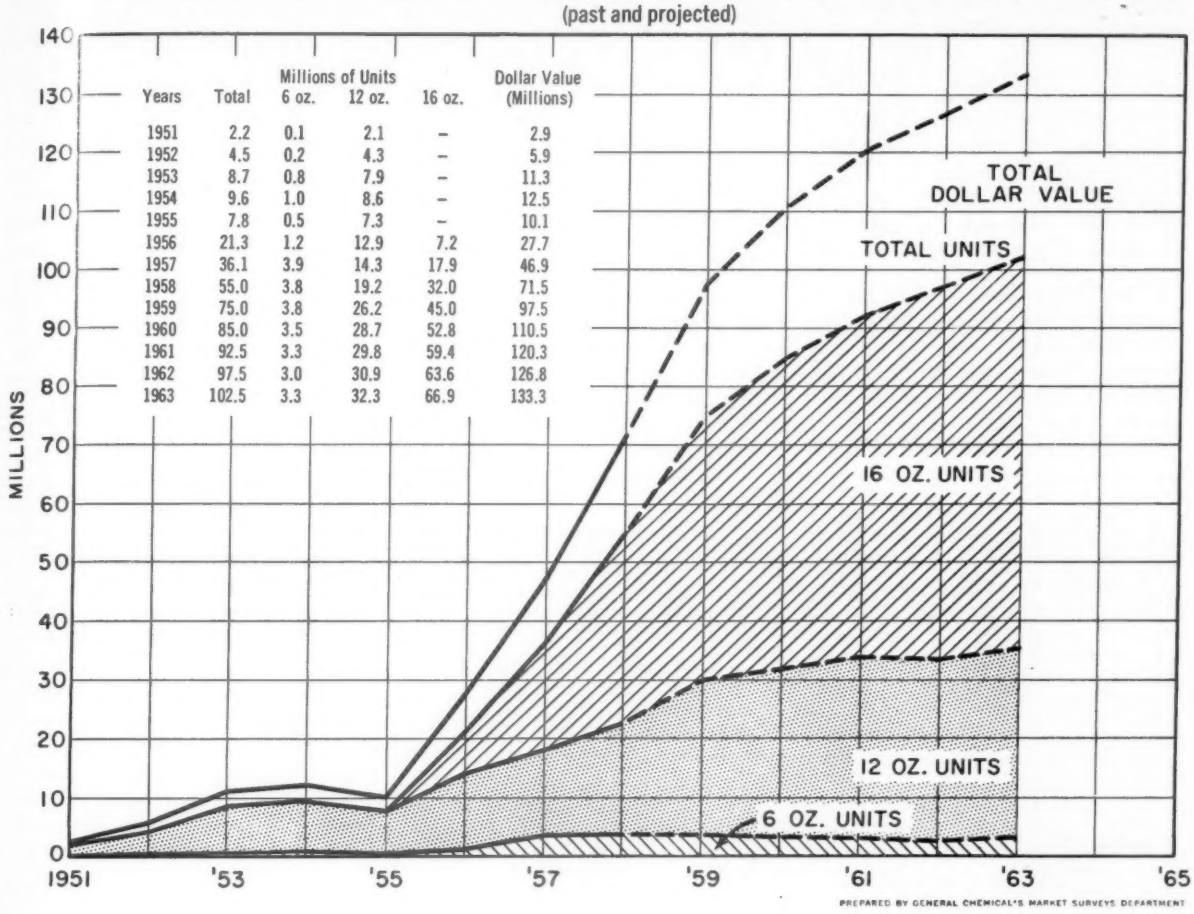
This represents an additional 10,273,200 gallons, or approximately 187 million aerosol paint units. Added to existing aerosol sales of 55 million units, it would place the total potential market for standard aerosol house paints at 242 million units per year! And there's more!

2. Acrylic lacquers and resins

Although the standard coating market is the primary aerosol sales target, other areas are "naturals" for aerosols. For example, autos, bicycles, toys, metal

GROWTH OF PIGMENTED & METALLIC AEROSOL PAINTS

(past and projected)



Years	Millions of Units Total	6 oz.	12 oz.	16 oz.	Dollar Value (Millions)
1951	2.2	0.1	2.1	–	2.9
1952	4.5	0.2	4.3	–	5.9
1953	8.7	0.8	7.9	–	11.3
1954	9.6	1.0	8.6	–	12.5
1955	7.8	0.5	7.3	–	10.1
1956	21.3	1.2	12.9	7.2	27.7
1957	36.1	3.9	14.3	17.9	46.9
1958	55.0	3.8	19.2	32.0	71.5
1959	75.0	3.8	26.2	45.0	97.5
1960	85.0	3.5	28.7	52.8	110.5
1961	92.5	3.3	29.8	59.4	120.3
1962	97.5	3.0	30.9	63.6	126.8
1963	102.5	3.3	32.3	66.9	133.3

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cabinets and other products in the home are painted best by *spraying* acrylic resin paint or quick drying lacquers. Aerosol packaging expands these areas with the "do-it-yourselfer"—and, in this case, there is no unfavorable price comparison with non-aerosols.

3. Specialty coatings

Increasing demand for a variety of specialty coatings promises additional growth opportunities for aerosols. For example, multi-color, speckled-type paints in aerosols which can produce a stippled or textured finish represent a good possibility. Waterbased paint in aerosols may also find wide application for touch-up work and painting of small areas in the house.

How to enter the aerosol market

As one of America's leading suppliers of aerosol propellants, General Chemical offers many helpful services to present and prospective aerosol coating marketers. For example, we can show you promising new aerosol formulations developed in our "Genetron" aerosol propellant laboratories . . . and can help you develop your *own* new aerosol formulation.

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For further information—or if you would like to arrange for a special presentation on the aerosol coating market – write today to "Genetron," General Chemical Division, Allied Chemical Corporation.

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Chemical Specialties Assn. Reports Rise in Production of Aerosols Seen in Next 10 Years.

Production and sales of nonfood products in pressurized, push-button aerosol containers should double in the next ten years, with the spray packages selling at the rate of at least a billion units per year by 1968, manufacturers of specialty chemicals were told.

That optimistic outlook for a segment of the packaging industry that began only since World War II was voiced by Ralph A. Crane, market research manager of the Du Pont Company's "Freon" Products Division. In fact, he told delegates to the 46th annual meeting of the Chemical Specialties Manufacturers' Assn., the aerosol industry might even look to a two billion package per year business in the next decade if foodstuffs are adapted satisfactorily to pressurized packaging in the push-button containers.

"In the next ten years, four times as many nonfood aerosols—about eight billion—will be produced and sold as in the last ten years," Mr. Crane predicted. "And although food products now represent less than 20 per cent of the total pressure-packaging market, they may become the single largest growth area in the next decade," he said.

About 80 million food aerosols, principally whipped toppings, were turned out in 1958 with compressed gases such as nitrous oxide and carbon dioxide as the only acceptable propellents. Much of the hoped-for rapid growth in food aerosol production hinges upon approval of a liquefied propellent offering constant dispensing pressure, he said, adding that Du Pont hopes to provide the answer in its "Freon-C318" octafluorocyclobutane now awaiting approval by the federal Food and Drug Administration for use in foodstuffs.

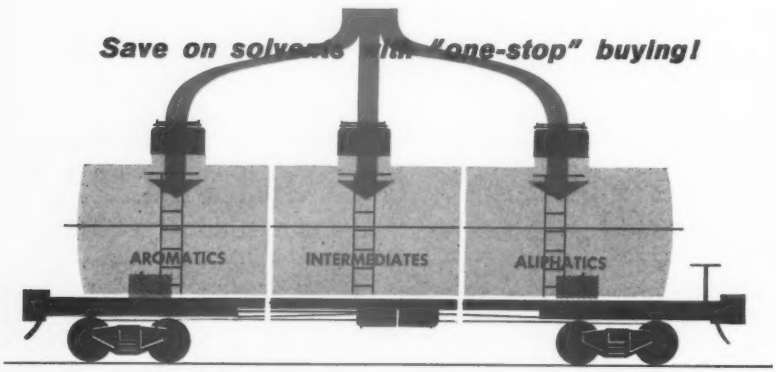
Among nonfood aerosols, six types of products—insecticides, room deodorants, shave creams, hair sprays, surface coatings, and colognes—accounted for 81 per cent of the 1958 production of 485 million aerosol packages, Mr. Crane said. These, along with dental cream which appeared in pressurized packages only within the last two years, will continue to dominate the market over the next decade, he predicted.

Basing his estimates upon projections of the U. S. population and spendable income, Mr. Crane said the average annual production rate of the aerosol industry should increase 7½ per cent per year during the next decade.

Aerosol insecticides will be produced at the rate of 107 million units per year in 1968, as compared to 71 million units turned out in 1958, and will increase their penetration of the overall insecticide market from the present 42 per cent to 50 per cent in 1968, he predicted.

Aerosol room deodorants, sales of which totaled 63 million units in 1958, may look to a 113 million unit market in 1968, while shave cream should jump from last year's 65 million units to nearly 100 million units by the end of the next decade, according to Mr. Crane.

James A. Brown, General Chemical Div., Allied Chemical Corp., advised the group that the use of plastics as valve components for aerosol containers has led to many questions concerning, the effect, it any, upon these plastics of various propellants. In this study, an attempt was made to determine some physical changes that occur to various plastics after contact with fluorinated hydrocarbons



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for prolonged periods of time. The physical changes of interest were dimension and weight changes.

The plastics that were selected are representative of different type polymers. These included Bakelite, Nylon 6, Nylon 66, Saran and Teflon, Polystyrene and Vinyl. The fluorinated hydrocarbons that were used as solvents for these tests were propellants 11, 12, 21, 112, 113, and 114 a. Tests were also run using methylene chloride so that comparisons could be made with a representative chlorinated hydrocarbon.

The method used to determine the swelling characteristics of these plastics was essentially that of ASTM method D543-52 T.

The results of the test showed that Bakelite, Nylon 6, Nylon 66, Saran and Teflon were only slightly affected by all of these solvents. With the exception of propellant 114a, polyethylene showed a weight gain in excess of 10% after immersion in all the solvents. Polystyrene broke down completely in all but the solvents containing the most fluorine in the molecule. The vinyl compounds were attacked considerably by the solvents containing hydrogen in the molecule.

With regard to the relative effect of the various solvent of all the plastic tested, certain generalities can be deduced.

In the methane derivatives the following progress is apparent:

CH_2Cl_2 > Propellant 21 > Propellant 11 > Propellant 12

It appears that hydrogen in the molecule leads to greater swelling so that methylene chloride and propellant 21 show a considerably larger effect on the plastics than propellants 11 and 12. Also, the effect of propellant 12 is much less than for propellant 11, which would indicate that as the fluorine content of molecule increases, the solvents' degenerative effect on plastics decreases.

With the ethane derivatives, it appears that increasing the fluorine content of the molecule decreases the swelling effects of the solvent, as shown by the following progression:

Propellant 114a < Propellant 113 < Propellant 112

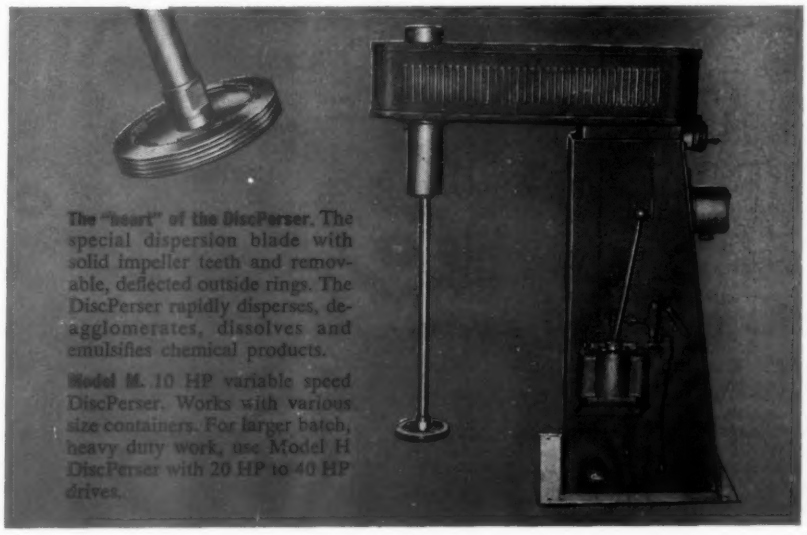
With the exception of plastics such as Nylon, Saran, Bakelite, Teflon, which show little deterioration when exposed to any of these solvents, a propellant having no hydrogen and a high fluorine content appears to be the least likely to cause trouble in aerosol systems containing a plastic.

D. C. Geary of Union Carbide Chemicals Co., spoke on low-cost water-based aerosols. He said that attempts to develop an aqueous two phase aerosol have met with little success. Problems of incompatibility with the propellant, container corrosion, oiliness and dispensing of the product as a cold, coarse, wet stream have been deterring factors. Advantages for developing water based aerosols are: increased quantities of water in aerosol formulations will permit reduced formulation costs, reduced flammability and incorporation of ingredients soluble only in water.

The paper is exclusively concerned with the solubility studies of ternary system of water, fluorocarbon propellants, and cosolvents and fluorocarbons propellants. Data derived from these studies is designed to shorten the time required to formulate successfully aerosol water based products.

These studies involved typical low cost water based insecticidal and household aerosol formulations.

Future work includes the de-



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velopment of low cost water base insecticidal sprays and hair sprays.

Solubility Parameters and their Application to Aerosols was the title of a talk given by Allen B. Reed, Jr., Pennsalt Chemical Co.

Reed defined solubility parameter as the number assigned to a solvent polymer that gives an indication of its solubility characteristics without relating it to another solvent or a special solute. It ranges in value from a low of 5.5 for silicones to a high of 23.4 for water. Solubility parameters may be applied to all solutions that are a combination of a solvent and a polymeric film former.

Reed explained that the development of this concept represents a big improvement over the existing emperical law and "rules of thumb" rules of "polarity" and "like dissolves like" which are not reliable with many exceptions taking place. Referring to work by Burrell, tables were developed showing these exceptions.

In an aerosol coating formulation, the propellant must be considered as part of the solvent composition. The effect of the propellant in this capacity is very important since it often represents 50% of total weight.

The adaptations of a standard paint to an aerosol can rarely be accomplished by the mere addition of propellant to the paint. A common result of this practice is the formation of precipitates and, of course, valve clogging.

Describing the problem of using vinyl resin in aerosol formulation, Reed demonstrated the importance of applying the solubility parameter concept to attain a compatible system. Verification of these concepts were confirmed by laboratory tests. In the above vinyl formulation, it is interesting to note that low molecular weight materials such as acetone will have greater efficiency in altering the solubility than higher molecular weight materials. This is due to the fact the parameter is related to the mole fraction rather than weight percent.

Reed concluded that the use of solubility parameters should be a very useful tool in planning development work on coating systems. Many solvents can be eliminated and an idea of the amounts of solvents required prior to actual formulation work can be estimated.

New Enamel Line

The National Lead Co., has announced the introduction of their quality quick drying enamel line in 16oz. aerosol spray containers.

The new aerosol line called "Spra-Swift" is being packaged under the blue and white "Dutch Boy" label and contains a complete range of metallic, a flat black, a gloss black and a clear in addition to standard fast moving quick drying enamel colors. The National Lead Co. uses colored caps on all containers for ready color identification together with the standard quick drying enamel color card for take-home selection.

The "Spra-Swift" line is being merchandised as a self service item through the use of rugged blue wire floor rack designed for compact can storage and easy consumer selection. The wire rack contains an attractive all metal clip-on sign with strong "Dutch Boy" identification and suggested product uses.

Two special opening offers on the "Spra-Swift" line currently being offered to all "Dutch Boy" dealers. For further information regarding "Spra-Swift", write to: National Lead Co., 111 Broadway, New York, N. Y., Room 1000.

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Amoroso Named Manager

Announcement of the appointment of Mr. John D. Amoroso, as plant manager has been made by Clark D. Matthews, president of Tube Manifold Corp., North Tonawanda, N. Y. Mr. Amoroso has had 20 years experience in engineering and plant management.

He received his BS Degree in mechanical engineering and electrical engineering from Carnegie Institute of Technology. He is a member of the Buffalo Chamber of Commerce, The Society of Automotive Engineers, The Engineering Society of Buffalo Inc., The American Society of Mechanical Engineers and the Institute of Radio Engineers.

The Tube Manifold Corp. manufactures liquid receivers as well as filter-driers for the refrigerating, air conditioning and automotive industries. Recent developments include a spherical disposable metal container used for hand held oxygen resuscitators and fire extinguishers. These spherical containers are made for working pressures up to 1750 lbs.



J. D. Amoroso

The TMC cylindrical disposable containers are a popular product in packaging liquids and gases used in industry and homes.

Fluorescent Aerosol Caps

Sterling Seal Co., Erie, Pa., announced development of a new line of fluorescent colored aerosol caps. The colors in the new line include three shades of red, a pink, two oranges, and two greens.



Rust Solvent and Penetrant, a product of Plasti-Kote, Inc., Cleveland, Ohio, received the top award as the most attractively designed package entered in the Industrial Products category of the 1959 Aerosol Packaging Award Competition. The Aerosol Packaging Awards are sponsored annually by the Chemical Specialties Manufacturers Assn., Inc. Awards were made on December 8th at the 46th Annual Meeting of CSMA at the Mayflower Hotel, Washington, D. C.



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NEWS

NEWS OF COMPANIES, ASSOCIATIONS
TECHNICAL GROUPS
ITEMS OF GENERAL INTEREST

Paint Technology Course Announced by U. of Fla.

The program and registration information for the fourth Short Course in Paint Technology at the University of Florida have been announced by Henry F. Payne, professor in charge of organic coatings research and technology. The course will be given February 1-5, 1960 and is sponsored by the University in cooperation with the Southern Paint & Varnish Production Club.



Henry F. Payne

The course is open to all who believe they may benefit from the program. Registration fee is $25.00; check payable to University of Florida and send to Henry F. Payne, Chemical Engineering Department. A copy of the complete papers presented at the course will be sent to registrants at least two weeks before the course begins. This will enable registrants to become familiar with the subject matter and be better prepared for discussion. The registration fee includes the cost of the papers and dinner on Wednesday, Feb. 3, but not other meals or accomodations. Details of housing facilities will be sent to registrants.

The program is as follows:

Monday, February 1
Resin Developments

Tung Oil in Emulsion Paints—C. A. Murray.

New Applications for Hydrocarbon Resins.

New Aromatic Acids for Coatings Vehicles—R. B. Perkins.

Recent Developments in Urethane Coatings—M. E. Bailey.

Butoxy Resins and C-Oil Polymers for Coatings—D. F. Koenecke.

General Discussion—All Speakers.

Tuesday, February 2
Exterior Paints For Wood

Vinyl Acetate Copolymer Emulsions for Exterior Paints on Wood—W. F. Scheufele.

Designing an All-Latex Paint System for Exterior Paints on Wood—R. H. Lalk.

Emulsion Paints on Wood—W. G. Vannoy.

Linseed Oil Exterior House Paints—D. K. Farstad.

Preservatives for Oil and Emulsion Paints—R. T. Ross.

General Discussion—All Speakers.

Wednesday, February 3
Cellulosic Polymers In Coatings

Half-Second Butyrate—F. M. Ball.

Solvent Resistant Lacquer Systems—E. C. Hamilton, R. P. Hirt.

Recent Developments in Nitrocellulose Lacquers—R. B. Pyewell.

General Discussion—All Speakers.

Dinner Meeting.

Anecdotes on Collecting Ceramics—Henry Fleming Payne.

Thursday, February 4

Lead-Free Colors—Sevier Bonnie, Jr.

Pigments for Green Paints—L. R. Sherman.

Copper Phthalocyanine Pigments—L. A. Melsheimer, L. L. Seivard.

New Developments in Pigment—Colors—E. C. Botti.

General Discussion—All Speakers.

Friday, February 5
Pigment Dispersion

Ball Mill Dispersion—O. H. Garlick.

Hi-Speed Mixer Dispersion—L.S. Behrns.

Dispersion of Pigments by Grinding with Sand—P. B. Cochran.

General Discussion—All Speakers.

Plant Maintenance Show To Feature Automation

Starting its second decade, the 11th Plant Maintenance & Engineering Conference will feature a broadly revised program to meet the changing needs of industry as it progresses toward more automatic production during the 1960s.

The annual conference is held concurrently with the Plant Maintenance & Engineering Show. Both events will be held at Convention Hall, Philadelphia, the show from Jan. 25 to 28, and the conference from Jan. 25 to 27.

Conferences have been held on the East coast only twice before, in 1952 and 1956. The show is expected to be the largest in its history with five acres of exhibit space devoted to the products and services of more than 400 companies.

Among the new topics added to the 1960 program are "Research and Development Techniques in Maintenance," "Plant Engineering in Planning to Combat Disaster by Flood and Tornado" and "What the Plant Engineer Should Know About Building Design and Construction."

To Manufacture in Argentina

Nuodex Products Co., a division of Heyden Newport Chemical Corp. announced today that it has granted a license to Nuodex Argentina, S. A. to manufacture a complete line of paint driers and several specialty chemicals in the vicinity of Buenos Aires.

Nuodex Argentina was formed by Heyden Newport and a group of prominent English and Argentine businessmen, headed by Mr. Cyril Taylor, President of Rodrap, S. A. of Buenos Aires.

Mr. Arthur Minich, President of Nuodex Products, stated, "this is the twelfth foreign country where Nuodex products will be manufactured under license, to ensure that the Argentine paint industry will soon be able to count on a dependable source of supply for some of its most critical raw materials."

NEWS

Canadian Institute Establishes Awards

The Protective Coatings Division of The Chemical Institute of Canada has announced the establishment of two annual awards for technical papers. The papers submitted for consideration by the Awards Committee must be directly related to the protective coatings industry.

The awards consist of a $100.00 First Prize and a $25.00 Second Prize; these will be offered for the first time for papers submitted by February 1, 1960.

Among the conditions for the award are that the papers shall be of such calibre that they will reflect a step forward in a real scientific contribution to the industry.

The paper must be a concise and informative discussion of approximately 3,000-6,000 words although the length mentioned is a guide and will not be held as a binding requirement. Papers must be accompanied by a 200-300 word abstract. The competition is open to members of The Chemical Institute of Canada and to all undergraduate and graduate students of a Canadian university.

The papers will be rated on the following points: originality, scientific importance, practical value to the paint, varnish or lacquer industries, completeness of discussion, significance of deductions, and quality of composition.

Further details of the awards are available from: The Chemical Institute of Canada, Dept. PVP, 18 Rideau Street, Ottawa, Ont.

New Carbide Plant

Union Carbide Plastic Company's new liquid epoxy resins plant at Marietta, Ohio, has gone on stream, it has been announced.

The plant has a rated capacity of 15,000,000 pounds annually and will produce epoxies for such end uses as protective coatings, reinforced plastics, laminating materials, production tools and dies, adhesives, and encapsulation and potting of electronic components.

Fiero Elected President of Chemical Specialties Assn.

George W. Fiero of Esso Standard Oil Co. was elected President of the Chemical Specialties Manufacturers Assn., at the organization's 46th Annual Meeting in Washington, D. C.

H. W. Hamilton, for many years Secretary of the association, was appointed to the newly created post of Executive Vice President.

Other officers elected were First Vice-President, Charles E. Beach, John C. Stalfort & Sons Inc., Baltimore; Second Vice-President, Charles E. Allderdice, Jr., The Bell Co., Chicago; Treasurer, Frederick G. Lodes, Lodes Aerosol Consultants Inc., New York; and Secretary, A. A. Mulliken.

Elected to three-years terms on the Board of Governors were Donald M. King, Masury-Young Co., Boston; Peter C. Reilly, Reilly Tar & Chemical Corp., Indianapolis; Joseph E. Lee, McLaughlin Gormley King Co., Inc., Minneapolis; and Joseph J. Tomlinson, General Chemical Div., Allied Chemical Corp., N. Y.

Dr. Fiero, CSMA's new President has for 25 years been engaged in research and development work covering nearly all products of the various CSMA divisions. His experience includes fourteen years of university teaching and research and three years with the War Production Board during World War II.

He obtained a degree in pharmacy and his master of science degree from the University of Southern California. Lated he obtained his doctorate in pharmacy from the University of Buffalo and his doctor of philosophy degree from the University of Wisconsin. He joined the Esso Standard organization in 1945.



The Los Angeles Paint, Varnish and Lacquer Association held its regularly scheduled monthly luncheon November 3, 1959 at the Statler Hotel, Los Angeles, California with H. C. McClellan of Old Colony Paint and Chemical Co. the guest speaker. Among those in attendance were:

Front Row: (left to right)

Fred W. Wansner	Sherwin-Williams Co.
Raymond T. Carey	Savogran Pacific Corp.
Kevin B. Moore—Vice President	Willis-Moore Paint Specialties Inc.
H. C. McClellan—Guest Speaker	Old Colony Paint & Chemical Co.
Edwin G. Burling—Secretary-Treasurer	Titanium Pigment Corp.
W. H. Fellows	Old Colony Paint & Chemical Co.
George D. Wartman	Sherwin-Williams Co.

Back Row: (left to right)

Ed Taylor	E. B. Taylor Co.
T. L. Dowling	W. P. Fuller & Co.
S. Y. Pitts	Retired
Percy Keith	W. P. Fuller & Co.
L. A. McLean	Savogran Pacific Corp.
Dean Morgan	Retired
John Vaughn	Better Business Bureau
T. J. Phipps	T. J. Phipps Co.
R. S. Richter	Retired

NEWS

Levinson, Congelton, Rose Receive PVAC Awards

Sidney B. Levinson, John S. Congelton and Carlton H. Rose received the highest honor bestowed by the New York Paint & Varnish Production Club. The event took place at a special meeting in their honor, January 7, 1960.

An added feature at the PaVaC meeting was the initiation of a PaVaC lecture. The speaker was L. J. Venuto, who discussed *Carbon Black—The Tiny by Mighty Particle.*

L. J. Venuto received his degree of B. S. in Chemistry at the University of Pennsylvania in 1923. He joined Binney & Smith Co., sole sales agents for Columbian Carbon Co., in 1924 and became their Research Director. At present he is associate Technical Director of the latter Co. His



Sidney B. Levinson



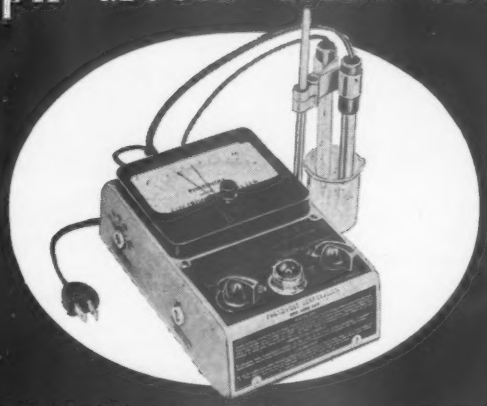
John S. Congelton

principal work has been in the field of colloidal dispersions of Carbon Blacks, dispersing techniques and applications. He has given many lectures and written many articles on the subject. He is the author of *Carbon Black for Protective and Decorative Coatings* and *Carbon Blacks for Inks.*

Mr. Venuto not only is an active member of the Club, but was honored with the PaVaC Award in 1954. Therefore his lecture was extremely appropriate for the PaVaC meeting.

The talk illustrated with slides covered spatial relationships, intimate views of the carbon black particle, functional uses as related to primary properties, dispersion and blackness as related to particle diameters, light and electron microscope pictures of a carbon black dispersion, relation of vehicle mole-

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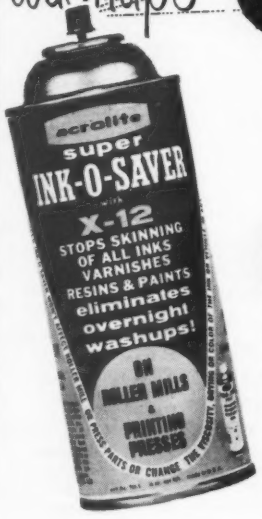
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STOPS SKINNING AT ONCE!
Works with all resins, varnishes, inks and grinding vehicles. Cannot affect the batch or equipment in any way.

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NEWS



Carlton H. Rose



L. J. Venuto

cular diameters to carbon particle clusters, and discussion of above relationships.

Antara Distributor

Moss Soap Company, 1157 N. W. 22nd Street, Miami, Fla., has been appointed by Antara Chemicals to act as the distributor of its line of chemical products in the lower Florida area.

Included in this new arrangement are Igepal nonionic and anionic surfactants, Alipal anionic surfactants, Cheelox sequestering agents, Biopal iodophors, ethylene and diethylene glycols and a variety of other chemicals.

1960 Pricing Program

Canco Div., American Can Co. announced its pricing program for 1960. Although prices for metal containers will be slightly higher effective Jan. 15, in most cases they will remain well below levels prevailing prior to a new pricing policy established in November, 1958.

In keeping with one of the primary objectives of the basic pricing policy, customers are being notified that the revised prices are guaranteed to December 31, 1960, provided there are no cost increases in steel plate directly related to metal containers.

The policy of pricing each type of container equitably on the basis of costs is also being continued. In 1959 this policy resulted in substantial reductions in the prices of many types of containers

New Bisphenol-A Plant

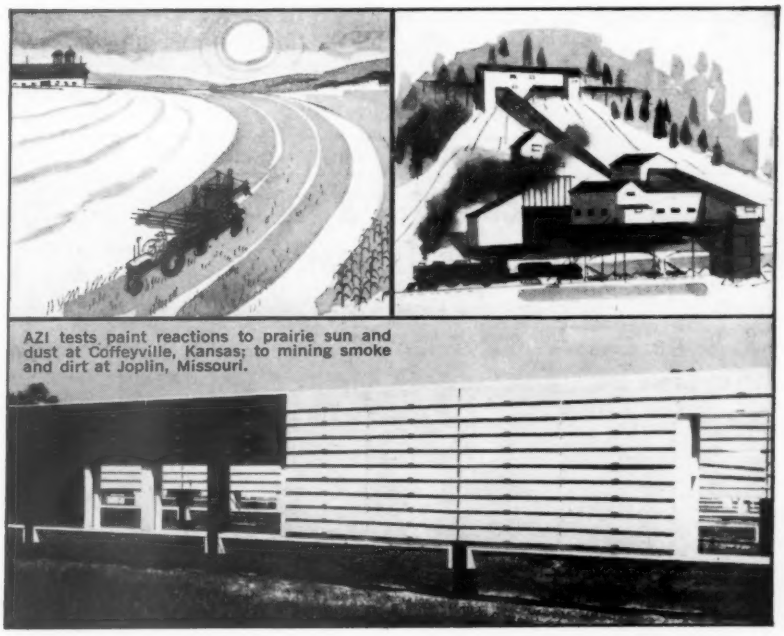
New plant to produce bisphenol-A will be built at Marietta, Ohio. Bisphenol-A serves as a basic chemical constituent in epoxy resins and other phenol-based plastics.

These newly authorized facilities, scheduled for commercial operation early in 1961, will have a rated annual capacity of 25,000,000 pounds of bisphenol-A.

The plant will be constructed at the existing plant site of Union Carbide Plastics Co., division of Union Carbide Corp. at Marietta, and will be operated by the company.

Tests in Kansas and Missouri study paint life

ON THE PRAIRIE *and* **AROUND A MINE**



AZI tests paint reactions to prairie sun and dust at Coffeyville, Kansas; to mining smoke and dirt at Joplin, Missouri.

Research by AZI helps you improve paint formulations

Paint reactions to prairie sun and dust and to the harsh atmospheres of a mining area are being studied as part of nation-wide tests now being sponsored by AZI. Others include tests for paint reactions to sea air and city and industrial atmospheres. These tests will indicate best levels of zinc oxide for improved durability, tint retention, non-chalking action, and resistance to mildew.

Improvements like these in paint quality often result in increased sales—and profits; yet added levels of ZnO provide these improvements for only a fractional part of the total cost of the paint.

To stay abreast of the progress and results of all tests, write: American Zinc Institute, 60 East 42nd Street, New York 17, New York.

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NEWS

Cohan Receives 4th Annual Shuger Memorial Award

The Baltimore Paint Varnish Production Club met jointly with The Baltimore Paint Varnish & Lacquer Association for the presentation of the fourth annual Herman H. Shuger Memorial Award to Leonard H. Cohan of Hanline Brothers. There were approximately 110 present.

Among these present were the new National Officers of the Federation.

Raymond C. Adams, President
Eugene H. Ott, President Elect
C. Homer Flynn, Executive Secretary.

This was the first official visit to a Production Club since the new officers had taken office in Atlantic City.

Last year's recipient, Mr. O. J. Hinz, presented the award to Mr. Leonard S. Cohan. In the acceptance speech Mr. Cohan stated what an honor it was to receive this award, and told of some of the past work that was done for the local club by Herman H. Shuger.

Present at this meeting was Mrs. Leonard S. Cohan and also Mrs. Herman S. Shuger, who was escorted by her son, Sewell J. Shuger, President of Baltimore Paint Varnish & Lacquer Association.

After the presentation of the award, there were very interesting talks given by the National Federation Officers present. Mr. Raymond C. Adams gave a talk on Co-Ordination Between National Federation and The National Association in regard to their co-operation in supporting the Paint Research Institute. He stressed the fine co-operation between the two associations. Also, he mentioned some of the things the Federation had in mind for the coming year.

Technical Committee Outlines Future Plans

The Technical Committee of the New York Paint & Varnish Production Club held its November Meeting at the Brass Rail in New York City, Nov. 19.

Chairman Sidney Levinson presided and presented a desk set to the former chairman Herb Hillman.

A tentative speakers' program was announced, as follows:

January — Max Saltzman, Harmon Color Co., National Aniline Div. *Hazards in Color Measurement*

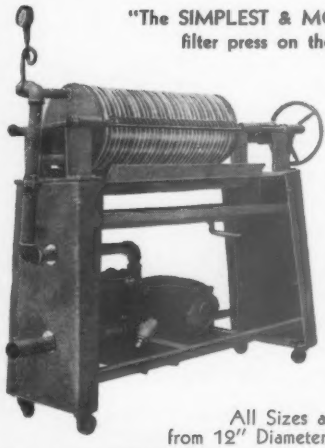
April — George Waters, Shell Oil Co. *Practical Use of Solvent Parameters in Paint Formulations.*

June — Mel Gerson, Sandoz, Inc. *The Colormaster and How to Use It.*

There was some discussion on the question of new topics for study by the Technical Committee. Considerable interest was expressed in connection with "corrosion resistance" and "properly variations in paint formulations due to type of dispersing equipment". Also discussed were driers and methods of determining optimum drier combinations and drying problems with isophthalic alkyds.

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PERSONNEL CHANGES

NAFTONE

Allen G. Lilla and **Carl Teiwes** have been elected vice-presidents it has been announced.



A. G. Lilla

Both new officers have been well known to the paint manufacturing industry for many many years. Mr. Lilla, director of sales, for the last fifteen months, has been associated with the paint trade for eighteen years. He was formerly district manager of Oronite Chemical Co., assistant to the vice-president in charge of sales at Ferro Chemical Corp., and technical sales representative and research chemist at The Eagle-Picher Co., before joining his present firm. He is a graduate of Kansas University with a degree in chemistry.

Mr. Teiwes was for over 25 years connected with William S. Gray and Co. where he was secretary and in charge of its foreign as well as a large portion of it's domestic sales. During his activities with Gray he also traveled extensively in South America and Western Europe as well as in this country.

AMERICAN

Dale J. Bartizal has been appointed sales representative in the Middle West it has been announced. His territory includes southern Wisconsin, Northern Illinois, and the north part of Indiana as well as eastern Iowa.



D. J. Bartizal

Mr. Bartizal joined the firm in May, 1959 after previous marketing and sales experience. He graduated from the University of Indiana in 1954 with a Bachelor of Science Degree in Business Administration and then served two years in the U. S. Army.

RINSHED-MASON

Howard Robinson was appointed factory manager of the Detroit plant, it has been announced.

Mr. Robinson, a Chemical Engineering graduate of Princeton University, has been with the firm for 12 years; recently, as assistant factory manager.

WYANDOTTE

Ken W. O'Connor has been named resident sales representative in the southwestern district it has been announced.



K. W. O'Connor

A graduate of the University of Texas with a B.B.A. degree, Mr. O'Connor spent two years in sales and public relations work following his army service in 1954. Immediately prior to joining the firm, he was a sales representative for the Tubular Lining Corp., suppliers to the petroleum industry.

Mr. O'Connor's territory includes Texas and New Mexico. He will reside and operate from his home in Houston.

CONTINENTAL CAN

B. D. Bloser, formerly general manager of Cannery Equipment Service, has been appointed general manager of production Engineering it has been announced. **F. J. Hoffman,** previously manager of Cannery Equipment Service in the firm's eastern metal division, succeeds Mr. Bloser as general manager of Cannery Equipment Service.



B. D. Bloser

Gordon Alexander, formerly district supervisor in Syracuse, N. Y., for Cannery Equipment Service, becomes manager of this Service for the eastern metal division.

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CLIMAX

E. E. Smith has been appointed manager of the chemical division, it has been announced. In his new post, Mr. Smith will direct all chemical sales and development activities. This covers a wide range of materials including: lubricant additives; catalysts; pigments; corrosion inhibitors; agricultural chemicals; and numerous intermediate and development chemicals.


E. E. Smith

Mr. Smith previously served the company as manager of chemical sales, a post he held for two years. He joined the firm in 1955 as manager of lubricant development and was responsible for the introduction of Molysulfide* additive to the chassis grease market as well as several new industrial fields. Active in the petroleum and chemical industries for ten years now, he began his career with Cities Service Oil Co. where he was concerned with sales activities for waxes, industrial lubricants, and numerous other petroleum products.

UNION CARBIDE

Charles P. McClelland has been named associate director of the technical service laboratory, Tarrytown, N. Y. it has been announced. In his new position, Mr. McClelland will administer the company's university fellowships supported by the marketing group, follow customer requirements for improved specification standards for industrial chemicals, co-ordinate Technical Service Laboratory training functions, and also customer service activities.


C. P. McClelland

PERMAGILE

Philip Maslow has been appointed technical director, it has been announced. Previously supervisor of the Coatings Technical Service Laboratory of the CIBA Products Corp., Mr. Maslow holds B. S. and M.S. degrees in Chemistry from the College of the City of New York and has been actively associated with the coatings industry for the past twenty years. He is a member of the American Chemical Society and the American Society for Testing Materials.


Phil Maslow



Jan. 20-22. 33rd Annual Convention, Assn. of American Soap and Glycerine Producers, Inc., Waldorf-Astoria Hotel, New York City.

Feb. 15-17. Meeting of Committee D-1 on Paint, Varnish, Lacquer, and Related Products of the American Society for Testing Materials, Shoreham Hotel, Washington, D. C.

Feb. 25-27. 5th Symposium, Pacific Paint Production Clubs and Paint Material Equipment Show, Hotel Statler, Los Angeles, Cal.

PRODUCTION CLUB MEETINGS

Baltimore, 2nd Friday, Park Plaza Hotel.
Chicago, 1st Monday, Furniture Mart.
C.D.I.C., 2nd Monday.
Cincinnati — Oct., Dec., Mar., May, Hotel Alms.
Dayton — Nov., Feb., April, Suttmilers.
Columbus — Jan., June, Sept., Fort Haves Hotel.
Cleveland, 3rd Friday, Cleveland Engineering & Scientific Center.
Dallas, 1st Thursday after 2nd Monday, Melrose Hotel.
Detroit, 4th Tuesday, Rackham Building.
Golden Gate, 3rd Monday, Sabella's Restaurant, San Francisco.
Houston, Monday prior 2nd Tuesday, Rams Club.
Kansas City, 2nd Thursday, Pickwick Hotel.
Los Angeles, 2nd Wednesday, Scully's Cafe.
Louisville, 3rd Wednesday, Seelbach Hotel.
Montreal, 1st Wednesday, Queen's Hotel.
New England, 3rd Thursday, University Club, Boston.
New York, 1st Thursday, Brass Rail, 100 Park Ave.
Northwestern, 1st Friday, St. Paul Town and Country Club.
Pacific Northwest, 3rd Thursday, Washington Athletic Club, Seattle, Wash.
Philadelphia, 3rd Wednesday, Philadelphia Rifle Club.
Pittsburgh, 1st Monday, Gateway Plaza, Bldg. 2.
Rocky Mountain, 2nd Monday, Republican Club, Denver, Colo.
St. Louis, 3rd Tuesday, Kings-Way Hotel.
Southern, Annual Meetings Only.
Toronto, 3rd Monday, Oak Room, Union Station.
Western New York, 1st Monday, 40-8 Club, Buffalo.

NEW JERSEY ZINC

Robert W. Munson has been appointed assistant eastern district sales manager, it has been announced. His principal assignment will be the supervision of the company's pigment sales activities in the southern area of the eastern district.



R. W. Munson

Mr. Munson started his employment with the company in 1947 as a salesman in the Los Angeles office. He was made district sales manager for the west coast in 1952. The following year he was transferred to the pigment sales organization in New York.

DIANOL

Gordon W. Orthner has been named sales manager, it has been announced. Mr. Orthner will head all sales activities for the firm. He will assume responsibility for the marketing of new products.



G. W. Orthner

He was formerly president of the Gordon Orthner Agency, manufacturers' representatives, and has extensive experience in the paint field.

Mr. Orthner has owned his own business and has served the wholesale trade on both paint and marine products for many years.

U. S. STONEWARE

Shelby A. Davis has been named sales manager of the coatings division it has been announced. In his new position Mr. Davis will direct the sales of corrosion-resistant paints, plastisols and dipped items.



S. A. Davis

Mr. Davis has been a member of the company's sales department since 1955 and as such has acquired a broad experience in corrosion-resistant products and materials of all types. For five years previously, he was with the W. J. Ruscoe Co. selling coatings and adhesives.

COLUMBIAN CARBON

Frederick G. Law has been elected a vice president, it has been announced.

Mr. Law is president and a director of Fred'k H. Levey Co., Inc., a wholly owned subsidiary of the firm.

UNITED

Morrison M. Bump has been elected executive vice president it has been announced.



M. M. Bump

In addition to his corporate marketing responsibilities, Mr. Bump in his new position will direct all marketing activities including domestic and international sales, technical service, distribution, and marketing public relations and advertising.

Prior to joining the firm, Mr. Bump was president of Union Paste Co.

DUCROS

Malcolm Scott C. McVay has joined the sales force it has been announced. Mr. McVay, formerly with Diamond Alkali Co., graduated from Miami University, Oxford, Ohio, with B. S. degree in Business Administration.

VULCAN

Vern I. McCarthy, Jr. has been named president and director of marketing it has been announced.

Mr. McCarthy, Jr., is the third generation of the McCarthy family to serve the company as president.

With the company in an executive capacity since 1953, the new president has served in a number of other posts for more than 15 years. Prior to this appointment, he was vice president-marketing and director of sales.

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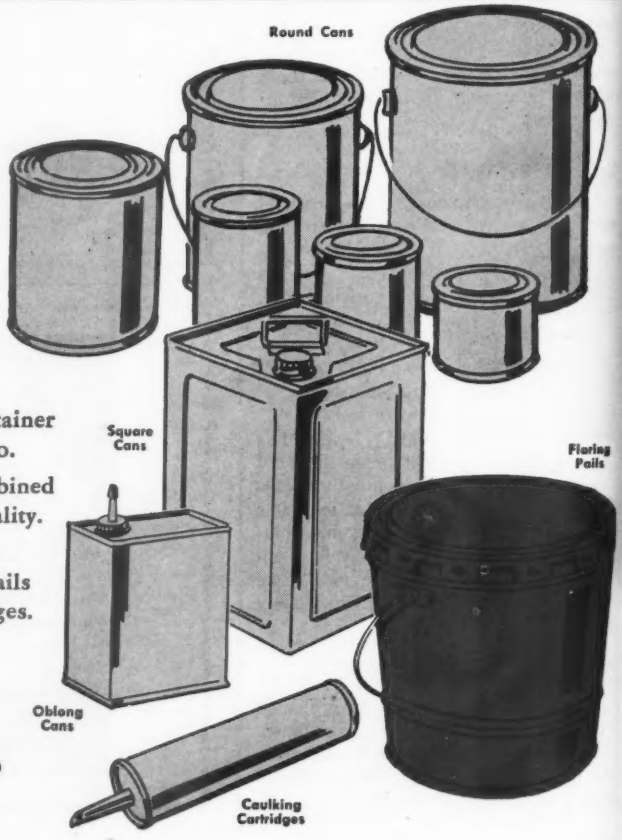
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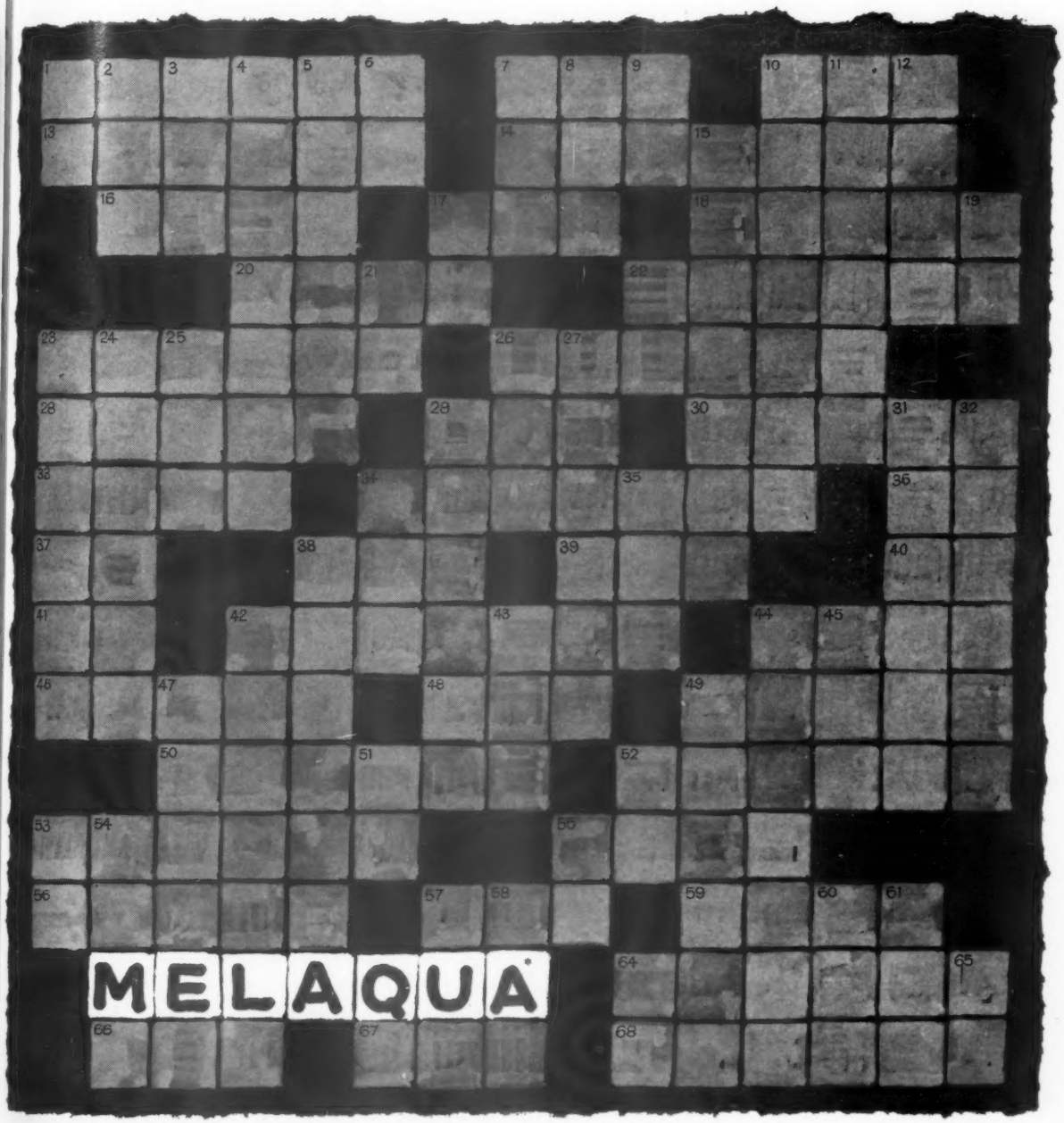


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The advent of the electronmicroscope has made it possible to differentiate the basic crystal structure of hydrate aluminum silicate (kaolin) particles. Prior to the development of the electronmicroscope, it was not possible to fully evaluate the crystal structure of kaolin particles. At best optical microscopy could only distinguish the larger particles. The nature of the smaller particles was not fully known. It was inferred from many test results that the small particles had a different structure than the larger particles. However, with the use of the electronmicroscope it has now been proven that kaolin is composed of two basic forms. One is a small plate-like structure, and the other is stacks of individual plates so tightly bound together that it is impossible to separate them by grinding techniques. Generally speaking, the majority of the plates occur at a particle size of less than two microns. At particle sizes larger than two microns the material is composed of the stack structure. It is possible to obtain, by use of the centrifugal techniques, kaolin fractions of all plates, or all stacks, as well as varying ratios of plates and stacks.

In any given paint formulation, the ratio of plates and stacks in the kaolin has a marked effect on the properties obtained. For example, in an interior latex paint formulation the degree of angular sheen is dependent on the percentage of plates in the hydrated aluminum silicate. For a flat paint with no angular sheen a fraction with 100% stacks would be used. For semi-gloss applications a clay with 80% to 100% plates would be recommended. In exterior paints the percentage of plates in the clay appears to effect the chalking rate. Based on our tests the rate of chalking appears to be related to the percentage of stacks under two microns. For less chalking a lower percentage of plates would be used. For a more rapid chalking a higher percentage of plates would be used. More tests are under way to further evaluate these results particularly in the 100% stacks ratio.

